COMPLEXITY THEORY AS A TOOL
FOR UNDERSTANDING AND COPING WITH ETHNIC CONFLICT
AND DEVELOPMENT ISSUES IN POST-SOVIET EURASIA

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Abstract

Some units of post-Soviet Eurasia have avoided or minimized ethnic conflict; others have suffered from internal ethnic strife or ethnically inspired wars with neighboring states; and still others have managed since 1991 to repress ethnic strife. Jack Snyder argues that democratization is the key variable that accounts for these divergent outcomes. But achievements and difficulties on the path from Communist rule to a new way of life are more fully explained by each society's relative "fitness." This term, derived from complexity theory, signifies a society's capacity to cope with complex challenges and opportunities. A fit society can deal constructively with ethnic as well as with other political, economic, and cultural problems. If a society fails on any of these fronts, ethnic grievances are likely to become more acute and may explode in violence. When this happens, the society's ability to cope with other issues also declines. Thus, societal fitness is both cause and effect of overall development. Variations in fitness reflect the strength of what complexity theorist call "self-organization." This quality, in turn, depends heavily upon culture. Cultures long devoted to universal literacy and to independent thinking have a far greater capacity for self-organization than those that resisted universal literacy and free thinking.

Introduction: Qualifying Liberal Peace Theory

Liberal peace theory postulates that established democracies seldom if ever make war on one another (Doyle, 1997; Elman, 1997; Brown, 1996). How then does the theory account for war between Armenia and Azerbaijan, each of which--independent since 1991--has claimed to be democratic? Seeking to show the limits of liberal peace theory, political scientist Jack Snyder (2000) explains the presence or absence of ethnic peace by treating democratization as the independent variable. Thus, Snyder attributes the absence of ethnic violence in Estonia since 1991 to successful democratization. Ethnic calm in Uzbekistan, on the other hand, resulted from an efficient dictatorship. Between these extremes was a decade of ethnic strife pitting Armenians against Azeris and Abkhazians against Georgians. Snyder traces these ethnic conflicts, as well as the wars between Russia and Chechnya, to partial but unsuccessful democratizations.

To explain the successes and failures of democratization Snyder considers many economic and cultural as well as political variables. For example, he weighs the impact of early versus middle or late economic development. The violent ways of Serbian nationalists, he contends (Snyder, 2000, 207), have reflected their society's early but partial democratization (manipulated by rival dynasties while fighting the Ottomans) and its late industrialization (under President Tito). Snyder's broad treatment helps us to grasp the context but it leaves the reader unsure which factor, if any, determines whether there is ethnic calm or conflict.

Taking partial democratization as a source of nationalist violence is the more complicated because, Snyder concedes, it can cut in opposite directions. President Boris Yeltsin sent Russian troops into Chechnya in 1994 hoping to rebuild his popularity by appealing to nationalist sentiment. Instead, partially democratized Russians objected to this campaign and pressed the Kremlin to end it. "Thus, Russia's fragile democratic institutions could be mobilized in crisis against imperial excesses, but they were less effective in scrutinizing nationalist mythmaking on a day-to-day basis [Snyder, 2000, 236-37]."

Snyder's leitmotif of democratization--whether successful, partial, or nonexistent--serves as a heuristic organizing principle for assessing a wide range of past and present cases of political and economic development. But this approach embodies a tautology: "Successful democracy equals ethnic peace." We can know that democracy has taken root because there is no ethnic conflict; where ethnic strife appears, democracy is shallow. The independent variable becomes the same as the dependent.

This paper contends that movement toward or away from resolution of ethnic problems in newly independent states can be more fully explained by concepts derived from complexity theory. These concepts do not contradict explanations rooted in democratization but enrich them and offer linkages to other fields of knowledge. They start with a wider lens than democratization but include it. The concept of societal fitness, a major concern of complexity theory, *subsumes* political, economic, and cultural strengths. The precise role played by each strength in shaping societal fitness becomes an important but secondary question.

Generated by scholars from various disciplines, complexity theory integrates concepts from many fields to produce a new slant on evolution. Its exponents seek a general theory able to explain many different types of phenomena--social as well as biological and physical. If complexity theory has universal validity, it should also help us to understand ethnic and other problems in post-Soviet Eurasia. The contributions of complexity theory to this understanding are evaluated in this paper.

The analysis here suggests that complexity theory can enhance our ability to describe and explain the past and present. But the theory has much less utility for projecting alternative futures or prescribing policy. Still, complexity theory can enlarge our vision and complement other approaches to social science.

All the theories discussed here are macro: They focus on state and society or on the international system. They do not address the ultimate actor--individuals, often the decisive factors in tipping the balance of forces one way or the other. A full assessment of the past,

present, and future of any social system would have to analyze the key individuals and groups who shape it.

Having registered these caveats, let us summarize the essence of complexity theory and then apply it to explain divergent policy outcomes in the former Communist states of Eastern Europe and the USSR.

Essentials of Complexity Theory

Complexity theory is anchored in nine basic concepts: fitness, coevolution, emergence, agent-based systems, self-organization, self-organized criticality, punctuated equilibrium, and fitness landscapes (Lewin, 1992; Kauffman, 1993, 1995, 2000; Axelrod, 1997; Axelrod and Cohen, 1999; Lewin and Regine, 2000; Richards, 2000).

Fitness

Complexity theory defines fitness as the ability to cope with complexity. To survive challenges and make the most of opportunity, a fit organism can process information about and deal with many variables.

The theory posits that all life forms exist on a spectrum ranging from instability (chaos) to ultra stability (ordered hierarchy). Fitness is found in the middle ranges of this spectrum between rigid order and chaos--not in a crystal, where every atom resides in an ordered hierarchy; nor in gases whose molecules move at random. Move too far toward either pole, and you lose fitness. The fitness of the United States hovers close to the edge of chaos, while that of Singapore teeters on the brink of rigidity.

Coevolution

No organism evolves alone. Every individual, species, and society coevolves with others and with their shared environment. A change in any one actor or environment can alter the fitness of multiple actors (Lumsden and Wilson, 1981). The more variables shape a system, the harder to anticipate how change in one element will affect others (the "butterfly effect").

Nonlinearity and complexity are hallmarks of human social networks. Complexity theory endeavors to explain the process of complex adaptation within complex systems-- whether they be ecosystems, the Internet, or political systems.

Emergence

Coevolution often gives rise to "emergent properties"--holistic phenomena richer than the sum of their parts--even their genes and chemical ingredients. Thus, an infant's brain can learn more rules than are contained in its genes. Sometimes evolution seems to manifest a spontaneous "order for free."

Agent-based Systems

      An agent-based system is one in which independent actors, each following a few rules, self-organize to form an emergent phenomenon without central direction from above. Thus, many species interlock in a coral reef and provide one another protection from predators, temperature extremes, and strong currents. Without planning, they cooperate for mutual gain. Like a coral reef, every durable ecosystem is an emergent phenomenon.

Self-organization

      The key to fitness is self-organization resulting from the actions, planned or not, by independent agents. Together, they generate a system that copes well with complexity.

Self-organized Criticality

      Balanced between order and chaos, a fit being is like a sandpile which, if one more grain of sand is added, may collapse in an avalanche. This fragile equilibrium is called self-organized criticality. The sandpile metaphor, however, is not universally accepted and is not essential to complexity theory.

Punctuated Equilibrium

      The concept of punctuated equilibrium underscores that evolution is often marked by surges of speciation and avalanches of extinction (Gould, 2002). Species often develop quickly, endure with little change for a long time, and then die out suddenly--not gradually. Thanks to mutation and self-organization, members of the species find their niche and hang on to it. When their environment changes, they must adapt or disappear.

      Critics say that what appears as "punctuation" may result from an incomplete fossil record and analytical confusion between "individual," class," and "species" (Ridley, 2002, 11).   Even assuming that punctuation takes place, it difficult to say how long an equilibrium will endure--especially in politics. Scientists in many fields noticed in the 1990s that critical events (meteorological. geological. physiological) occur more often--both earlier and later than forecast by the model of a bell-shaped curve. Cosmologists in 2002 disagreed whether the universe began with a Big Bang or alternates every 14 billion years between expansion and contraction.

Fitness Landscapes

      Complexity theory suggests that coevolution can be mapped as a rugged landscape in which the relative fitness of each organism is shown as a peak rising or falling as a consequence of coevolution. As in an arms race, the peaks of a predator and its prey may gain or decline according to changes in their offensive and defensive capabilities. If attackers acquire more lethal weapons. the fitness peak of the prey will drop. If individuals among the prey population acquire characteristics that reduce their vulnerability, their peaks will rise.

Differences Across Eurasia: Variations That Need Explanation

The huge area to which we shall try to apply complexity theory is Eastern Europe and the former USSR (Karatnycky, Adrian, Motyl, Piano, 2001). Adapting Snyder's analysis, we identify four large domains that took shape in Eurasia after the breakup of the USSR in 1991--each distinguished by the way it dealt with ethnic issues and development issues. In zone A was a set of countries that benefited from ethnic calm and enjoyed gradual economic and political development. Zone B was a shatterbelt of ethnic conflict and material regress occurred. Zone C was a region--virtually frozen in time--with little ethnic conflict and stagnant economic life (except in countries where the promise of carbon fuels brought injections of outside capital). Finally, we may distinguish a hybrid zone D where major countries--Russia and Ukraine--shared some but not all characteristics of the other regions.

Zone A consists of societies and states that have experienced almost no ethnic violence and have made strong progress toward democratic institutions and economic development through market economics. From the former Yugoslavia, the exemplar is Slovenia. From erstwhile Soviet allies in Eastern Europe, the leaders are the Czech Republic, Poland, and Hungary. Of former Soviet Union-Republics, only Estonia, Latvia, and Lithuania belong in zone A (Clemens, 2001).

Zone B comprises societies embroiled in severe ethnic fighting--Chechnya, most of the former Yugoslavia, and the erstwhile Soviet union-republics of Armenia, Azerbaijan, Georgia, and Moldova. Each showed a very low capacity for coping with ethnic differences and the problems of establishing a viable economy and a stable democracy. In each case, as Snyder says, partial democratization probably aggravated ethnic tensions. Thus, "democracy" made it harder for Armenia's leaders to negotiate any kind of compromise with Azerbaijan over Nagorno-Karabakh, because nationalist firebrands could mobilize votes against them.

Zone C refers to Central Asia and Belarus, where dictators suppressed ethnic or other challenges to their rule. (In the 1990s Tajikistan experienced much fighting between political rivals, but ethnic differences were not at issue.) In the former Soviet union-republics of Central Asia, erstwhile Communist leaders became dictators claiming to be both nationalist and democratic. Kyrgystan had a free press for a time, but this ingredient of a true democracy disappeared in the mid-1990s. [Abutting the former USSR, Moscow's one-time client state Mongolia is a special case: In the 1990s Mongolia moved quickly toward democracy even though it was poorer than most parts of the USSR with a weak infrastructure for education and communication. The country had few internal ethnic problems (90 percent of the population is Mongolian; 4 percent Kazak; 2 percent Russian; 2 percent Chinese; 2 percent other) and did not clash with China despite the potential for expansionist claims by each side.]

President Aleksandr Lukashenko tried to russify Belarus and negotiate its union with the Russian Federation. His opponents sought to establish and maintain a clear Belarusian identity, but Lukashenko repressed them with little overt violence.

Where to place the other states not clearly in one of these three zones? In the early 21st century there were signs that Bulgaria, Romania, Slovakia, Croatia, Montenegro, and perhaps even Serbia might join zone A. But the scales teetered. Each of these countries could readily

drop into zone B or C. Thus, Serbia made major strides toward real democracy and peace with Montenegro in 2001-2002, but could still become embroiled in more ethnic warfare with Kosovars or the Hungarian-speakers of Vojvodina.

The two largest Slavic states emerging from the USSR comprised the hybrid zone D. By the early 21st century neither Russia nor Ukraine had achieved a real democracy or a strong market economy. But neither suffered from outright ethnic violence with one major exception: Russia's wars against Chechnya (1994-1996 and again 1999--). Nationalisms in the Russian Federation were both ethnic and civic in nature. They were "ethnic" to the extent that the state was based on the nation and its language. They were "civic" in so far as citizenship did not depend on ethnicity. Thus, Moscow recognized Tatarstan's "sovereignty" *within* the Russian Federation (*Rossiskaia Federatsiia*, where *rossiskaia* is more inclusive than the term *russkaia*, as "British" takes in more diversity than "English"). In March 2002, however, the Duma and President Putin seemed ready to require that any would-be Russian citizen be fluent in Russian.

Ukraine achieved a kind of civic nationalism incorporating native Russian and Ukrainian speakers. Kyiv avoided war with Russian irredentists in the Crimea and with Moscow over its claims to ships and naval facilities in Sevastopol. Like Russia, however, Ukraine failed to utilize effectively its vast natural resources and highly educated work force (D'Anieri, 1999). Transparency International placed Russia and Ukraine among the world's most corrupt countries in the late 20th and early 21st centuries.

Applying Complexity Theory to Explain the Past and Present Fitness

Adopting the language of complexity theory, this paper argues that Slovenia, the Czech Republic, Hungary, Slovakia, Poland, and Estonia in the 1990s demonstrated a high level of fitness. As we see in Table 1, they scored much higher on the United Nations Human Development Index (HDI) than did comparable peers such as Belarus, Bulgaria, Romania, and Macedonia. The same patterns held for the UN Gender-related Development Index (GDI); for Freedom House ratings of political and civil liberty; for the Heritage Foundation Index of Economic Freedom; and the honesty/corruption ratings of Transparency International. The Czech Republic, Poland, and Hungary joined the North Atlantic Treaty Organization (NATO) in 1999. The Baltic countries and Slovenia were the strongest candidates for NATO membership in 2002, when they were admitted along with three more problematic countries—Slovakia, Bulgaria, and Romania. The countries with the highest HDI ratings were also the most likely to be accepted into the European Union.

Societies in zone A achieved high levels of fitness on many fronts after the demise of the Soviet empire. Success in one domain helped them cope with problems in others. Ethnic peace made it easier to raise living standards, consolidate democracy, and nourish creativity. Economic advances in Estonia, for example, make it easier for Tallinn to provide welfare benefits for Russian-speakers residing in Estonia but who were not citizens.

On the other hand, countries in zones B, C, and D displayed low levels of overall fitness even though many possessed assets lacking in zone A. Thus, Azerbaijan, Kazakstan, and Russia possess energy resources far superior to those in any zone A lands. Parts of Ukraine and Russia have better soil than most countries in zone A.

Georgia, Armenia, Ukraine, and Russia have evolved from states and cultures dating back more than 1000 years. Slovenia, by contrast, was never an independent state before 1992. Estonia and Latvia had only two decades of independence.

Table 1. Former Communist Countries Ranked by HDI and Other Values

Country	HDI Rank	GDI Rank	Freedom Index	Economic Freedom	Honesty Rank
Slovenia	29	27	Free	79 (MU)	27
Czech Republic	33	32	Free	32 (MF)	52
Hungary	35	35	Free	32 (MF)	33
Slovakia	36	34	Free	60 (MF)	52
Poland	37	36	Free	45 (MF)	45
Estonia	42	n.a.	Free	4 (F)	29
Croatia	48	43	Free	108 (MU)	51
Lithuania	49	42	Free	29 (MF)	36
Latvia	53	46	Free	38 (MF)	52
Belarus	56	50	Not Free	148 (RE)	n.a.
Russian Federation	60	52	Partly free	131 (MU)	71
Bulgaria	62	53	Free	108 (MU)	45
Romania	63	55	Free	131 (MU)	77
Macedonia	65	n.a.	Partly free	97 (MU)	n.a.
Armenia	76	62	Part free	45 (MF)	n.a.
Kazakstan	79	n.a.	Not free	125 (MU)	88
Ukraine	80	66	Partly free	137 (MU)	85
Georgia	81	n.a.	Partly free	108 (MU)	85
Azerbaijan	88	n.a.	Partly free	118 (MU)	95
Moldova	105	86	Partly free	105 (MU)	93

CODE: Economic freedom: F=free; MF=mostly free; MU=mostly unfree; RE=repressed.
SOURCES: For "HDI" and "GDI," see United Nations Development Programme [2002]; for Freedom Index, see Freedom House, 2001; for Economic Freedom, see Heritage Foundation, 2002; for Honesty, see Corruption Perceptions Index, Transparency International, 2002.

Most countries in zones B, C, and D faced simpler ethnic challenges than in many zone A countries, because they were more homogeneous. Ethnic minorities were very small in Belarus, Moldova, the South Caucasus, and in most of Central Asia (except for Kazakstan). About four-fifths of the Russian Federation's population was Russian and most other groups

spoke fluent Russian. A million or so Chechens occupied only a dot on the Federation's periphery. Still, the governments in zones B, C, and D experienced great difficulty in dealing with ethnic minorities. By contrast, Estonia and Latvia in the 1990s faced minorities of Slavic speakers that made up more than one-third of the resident population. Most Estonian and Latvian leaders espoused a kind of ethnic nationalism but tempered it with some civic nationalism. They instituted a naturalization process that required aspiring citizens to pass residency, language, and civic tests. By 2002--more than a decade since independence--few of either country's Slavic speakers had acquired a working knowledge of the official state language. Still, ethnic tensions produced no deaths in the Baltic. Estonia even permitted noncitizens to vote in local elections. The city councils in Riga as well as Tallinn were sometimes dominated by coalitions of old leftists and "unity" parties devoted to the interests of Russian-speakers.

Self-organization

Self-organization takes in more than democratic politics. It entails also a market economy and a system that, from the bottom up, produces innovation and ways to meet needs and exploit opportunities. The centralized regimes in zones B, C, and D attempted to direct economic and culture life as well as politics from the top-down. As in Soviet times, they squeezed out newspapers and news media that contradicted the official line. President V. V. Putin was designated Acting President by his predecessor before a snap election that confirmed the appointment--bolstered by a then popular war against ethnic aliens. Privatization in Russia and most other countries in zones B, C, and D permitted privileged insiders to seize public resources at low cost.

Coevolution

Coevolution explains several features of post-Soviet Eurasia. Most countries close to Western Europe have coevolved with the West more quickly and thoroughly than those more distant. Thus, the Czech Republic is more "First World" than is Kyrgyzstan. But if a country shuts itself off or is otherwise isolated from global trends, its overall fitness will suffer. Thus, Albania abuts Greece but its Communist rulers sought autarky. Belarus abuts Poland and Lithuania, but the government's orientation toward Moscow serves to minimize productive exchanges with the West. Kazakstan "coevolves" with foreign oil drillers but this is a very limited facet of coevolution. In many respects Kazakstan and other Central Asia states resemble Communist Albania--cut off from the West by government fiat.

Emergence

Nowhere in the formerly Communist lands has there emerged strong patterns of cooperation. Instead, it has been more like "every state for itself"--indeed, "every national and subnational group for itself." Even in zone A, each state focused on joining Western Europe and NATO--not on cooperating for shared ends with its neighbors.

Rivalries in the Caucasus have persisted even though both Georgia and Armenia need the energy that Azerbaijan can provide and for which it needs buyers.

Central Asian states have been unable even to find ways to stop the shrinkage of the Aral Sea--an environmental disaster that affects the whole region.

The Commonwealth of Independent States has achieved many accords registered on paper but not in practice. Subgroups meant to resist or strengthen the commonwealth have achieved little.

Whatever the shortfalls of the European Union (EU), it is a triumph of cooperation compared to the beggar-thy-neighbor behaviors of ex-Communist societies. Indeed, it was EU and NATO demands for settled borders and ethnic peace that persuaded Hungary and Romania to patch over their differences and convinced Estonia and Latvia to renounce some border regions seized by Moscow in the 1940s.

Agent-based Systems

In zone A individual agents are free to innovate and carry on their business with a minimum of government control. The system is shaped by its members rather than by a central command (Epstein and Axtell, 1996; *International Studies Quarterly,* 1996). This is not quite "order for free," which complexity theory attributes to established ecosystems (such as coral reefs). Still, it resembles the positive results that Adam Smith expected if individuals were allowed to do what they do best, as if guided by an "invisible hand."

Self-organized Criticality

Complexity theory warns that societies may be less fit than they appear. Fitness depends on the harmony of many factors. Just as an extra grain of sand may cause a sand pile to collapse, a new or heavier burden could seriously weaken an apparently fit society. How would Lithuanians respond if a faulty nuclear reactor shut down their energy supply or spread poison to the air and soil? Or if Russians simply turned off the oil and gas flows on which many post-Soviet societies depend? Each Baltic country endured severe stresses in the 1990s but one cannot be sure what grain of sand may start an avalanche.

Punctuated Equilibrium

The concept of punctuated equilibrium warns us not to expect steady progress. West European unification did not emerge gradually but in sharp jumps and some steps backward. Meaningful social change often requires a period of preparation. New generations can be educated. In Estonia and Latvia native speakers of Russian are learning the official local language. Accumulating experiences may tip even middle-aged Russian-speakers toward integration with Baltic society. Long plateaus without improvement may drive some people to depart or take drastic steps to effect change. But regress is also possible. How long will displaced persons in Bosnia wait until they return to their homes?

Fitness Landscapes

The relative fitness of a fruit fly and a frog population may be portrayed as "peaks" that rise and fall with coevolution. Can we graph changing patterns of fitness among the societies of post-Soviet Eurasia? This is not a simple task, if only because fitness among

humans is multidimensional. The UN Human Development Index (HDI) provides a solid starting point to measure public health, education, and material living standards.

If we focus on ethnic problems, we would also study measures of ethnic harmony and its opposite--injury, dislocations, and deaths caused by ethnic unrest. We expect that low fitness in this domain will tend to correlate with low scores in overall human development, lack of political and civil liberties, low technological achievement, and corruption. Though it is difficult to show all these variables in a single peak, a cobweb graphic could illustrate the correlations suggested here (Maruca, 2000).

Predicting Ethnic Violence and Prescribing Remedies

Complexity theory provides useful concepts for analyzing ethnic issues and other ingredients of societal fitness. But it offers only general principles for anticipating future outcomes or prescribing constructive policies. In this regard, however, it does no worse than most competing theories--few of which provide useful handles for predicting or shaping the future (Singer, 1999). Indeed, if complexity theory is correct about the role of self-organization in cultivating societal fitness, Social Darwinists and ultrarealists are wrong: Success in politics does not derive from raw power plus cunning.

The fundamental insight of complexity theory is its prediction that fitness will be found along the middle range of a spectrum ranging from rigid order to the other extreme--chaos. This insight helps explain why Central Asia is frozen in time, why the Caucasus explodes, and why Russia resorts to an iron fist to overcome chaos.

This insight has clear policy implications: The leaders and publics of societies seeking high levels of human development should eschew the extremes of dictatorship and anarchy. To generate a healthy and innovative community, they must cultivate self-organization--not a system steered and manipulated from on-high. When Western policymakers and investors look at new countries such as Kazakstan and Azerbaijan, they should not count on authoritarian regimes to maintain order forever. It is shortsighted to try and prop up local dynasties in the hope of securing privileged access to oil and gas. Outsiders cannot compel internal reforms but should do what they can to nudge these societies toward greater self-organization. Countries such as Azerbaijan suffer not only from top-down controls but from a rent-seeking mentality among many well educated persons who will eventually play major roles in business and politics. Their attitudes as well as formal structures will determine whether Azerbaijan and Kazakstan use their petrodollars to create values for the entire community (as in Norway) or follow more closely the Saudi Arabian example.

Complexity theory's attention to independent actors agrees with the growing conviction among political scientists that institutions of civil society help to buffer the ravages of free markets and curb the excesses of willful governments. The stronger and more diverse the independent agents shaping the formerly Communist societies, the healthier and fitter they will be. Constructive policies will cultivate creative individuals, businesses, and NGOs that enlarge public goods and are not dominated by government. These independent agents face a

difficult struggle against the moral legacies of Communism--corruption, group-think, and a welfare mentality that discourage initiatives from the bottom up.

Even if the goal of self-organization seems clear, questions arise about the road to this goal. What if democracy terminates democracy--as happened in Germany in the 1930s? Is self-organization desirable if the majority votes against the minority, as happened in Sri Lanka and as Serbs feared would happen in a democratic Bosnia? And what if the majority brings in a government that imposes the laws and mores of one religion, as in parts of Nigeria?

How to Acquire and Nurture Fitness

Culture matters (Grondona, 1996; Jacquin-Berdal, Oros and Verweij, 1998; Harrison and Huntington, 2000). All the societies in zone A became oriented toward universal literacy, free thought, and open debate (relative to most other societies) long ago. The societies in zones B, C, and D moved toward universal literacy only in the past 100 years. Many regimes in these zones still discourage or try to prevent open debate on policy and other important issues.

Following the leads of John Wyclif, Jan Hus, Martin Luther and other reformers, each society in zone A acquired its sacred religious texts in the vernacular between the 15th and 17th centuries. For the first time in history, some princes and religious leaders also urged individuals--female as well as male--to read and interpret sacred texts on their own. This twin revolution helped to liberate all who experienced it (Clemens, 2002). After the Peasants' Revolt, however, Luther feared that he was provoking chaos. He then wrote his *Short Catechism* instructing people what to believe. But Luther could not stop the transformation he had unleashed. The synergies of literacy and individualist thinking were empowered by the printing press, the Renaissance, the discovery of New Worlds, and growing refinement of scientific methods. Catholic France and Italy had Bibles in the vernacular even before Luther's challenge to Rome. In the 17th century Sweden's monarchy and state church wanted their subjects--even servant girls--to read and discuss the Bible. Bibles in the vernacular also helped cultivate a sense of national identity (Hastings, 1997; Lepore, 2002).

Certainly many factors shape human development, but Figure 1 shows a strong correlation between high HDI scores and early publication of Bibles in the vernacular. Where Orthodox Christianity prevailed, Bibles in the vernacular were not widely published until the late 19th or the 20th century. (The sole exception was Romania, which published both the New and Old Testaments in the 17th century.) Wide-scale literacy came to the Orthodox countries much later than in Protestant and Catholic countries or in Jewish communities.

Unlike the Christian Bible, the language in which the *Quran* was first written is regarded by Muslims as sacred--the only truly accurate way to express God's message. Islamic societies did not encourage literacy or individual interpretation of sacred texts. For Arabs as well as non-Arabs, memorization and recitation of the *Quran* have been far more important than discussion. Few Bosnians, Azeris, or Central Asians have been able

to read classical Arabic. Translations of the *Quran* into Persian, Turkish, and Chinese have been largely in the form of paraphrase and commentary (Swartz, 2002).

Figure 1. Date the Bible Published in Vernacular vs. HDI rank of ex-Communist Countries
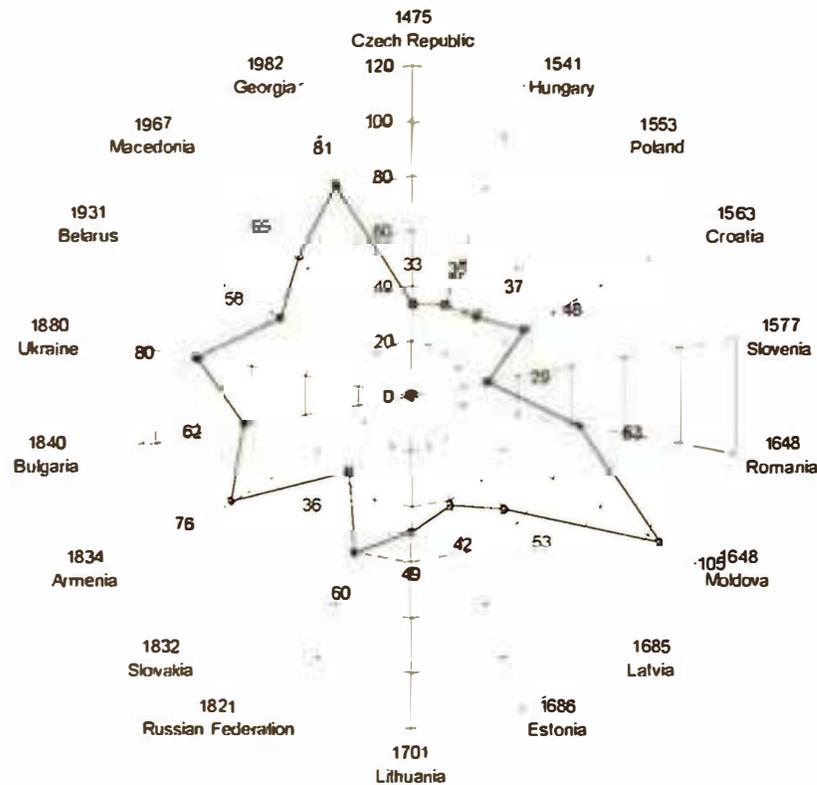
SOURCES: United Bible Societies. 2002: United Nations Development Programme. 2002.

By the 1950s Communism brought near universal literacy to the USSR and Eastern Europe--even to Albania. But Communist regimes and schools discouraged free thinking. Centralized controls channeled thought and discouraged debate. Even when Communist regimes sought to foster technological innovation, this proved difficult, because of state secrecy and communications networks that ran vertically but not horizontally. Soviet dissident Andrei Sakharov lost his security clearance and was sent into internal exile; many other dissidents suffered worse fates.

Conclusion

In the early 21st century most governments in zones B, C, and D still do not encourage free thought and debate. Until they do, they will not possess a necessary ingredient of social

fitness. Comparatively unfit, they will lag their more Westernized neighbors in many ways. In the language of complexity theory, these countries--even erstwhile superpower Russia--will wander in valleys, looking for ways to propel their peak(s) upward. Lacking self-organized economies and polities, they will have great difficulty dealing with ethnic issues within and across borders. Democratic in form but authoritarian in substance, they will tend to repress dissent rather than create solutions for mutual gain (Clemens, 1998).

At the onset of the 20th century most Russians still hoped that a vigorous leader, Vladimir Putin, like a legendary *vozhd*, would unite and mobilize the people for a better life. A few years earlier, Georgians had entertained similar hopes when Eduard Shevardnadze returned from Moscow to Tbilisi, promising to end a reign of chaos. But in Georgia, reliance on top-down leadership did not end turmoil. Rather, it added to the already heavy burdens of corruption at the center.

Russians, Georgians, Uzbeks, Kyrgyz and other denizens of the former Soviet Union got a fillip of hope from America's post-September 11 war on terrorism. Washington needed allies and even bases close to Taliban strongholds in Afghanistan. Perhaps America's strategic requirements would generate more foreign assistance for some former Soviet republics. But outside aid can be counterproductive—the nemesis of self-reliance. Greater dependency on the United States could harm self-organized fitness. Lacking internal strength, each people's capacity to cope with ethnic diversity could well decline--especially if exploited by political entrepreneurs hoping to gain power and wealth from others' differences (Singer, 1999, 57).

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