

**FORMS AND DYNAMICS OF LEADERSHIP  
FOR A KNOWLEDGE SOCIETY:  
THE QUAD**

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**Abstract**

While there is ample writing on the structural components of the information or knowledge society, the elements of leadership have been underreported. This essay defines the knowledge society as consisting of structural, network and leadership elements, and concentrates on the latter, defined as crosssectoral interactions among government officials, private managers, researchers and activists in civil society. When linked together into a four sided 'quad' relationship, these information champions together create the information revolution in Internet and other value-added activities. Based on field research in Brazil, China, Ghana and other countries, the study concludes that the more robust the 'quad' along several dimensions, the more successful is performance of the ICT sector. Innovation in local social architecture yields innovation in the technological infrastructure.

**Key words**

Innovation, leadership, knowledge society, politics

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## **Introduction**

Much of the scholarly work on the spread and performance of the Internet and other new information and communications technologies concentrates on macro-level factors such as economic level and structure. They typically link cross-national diffusion patterns to such factors as levels of GDP per capita or social structures. Writers like Mansell (1998) and Norris (2002) do an excellent job of capturing the fundamental longer-term determinants of the spread of these technologies. However, these same analysts tend to ignore the flip side of macro-structure – the micro-level actions of individuals as central determinants of the spread of the Information Revolution. The absence of careful considerations of individual agency is regrettable, since social change is not prompted only by the implacable forces of structure and history, but also by individual women and men pursuing their own distinct visions and interests as individuals and in small, informal groups. Narratives of the early days of Internet expansion written by historians like Abbate (1999), and popular accounts by thoughtful journalists manage to describe the fluid combinations of professional interests, energy, opportunity, innovation and luck and thereby reveal some of these individual level ICT dynamics.

Yet we lack an adequate analytic framework that captures individual and small group innovation, and that indicates precisely through what means individual women and

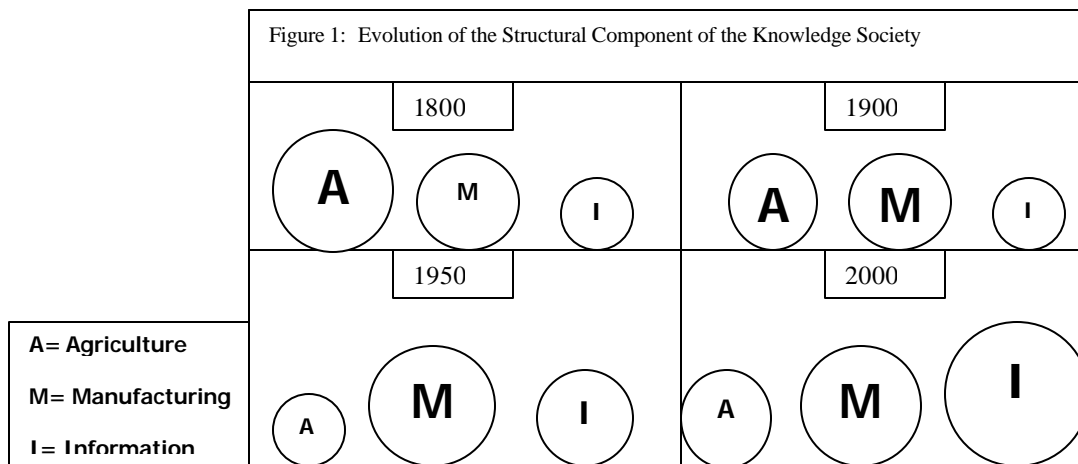
men have made the Internet one of the fastest expanding technologies in world history, one whose impact has begun to reshape core elements of modern society. My own research across a number of developing countries demonstrates that precisely in periods of rapid structural transition and societal uncertainty, leadership plays an especially important role in shaping innovation outcomes (Wilson, 2003). The actions of individual 'information champions' have begun to undermine inherited organizational hierarchies, to create pro-reform constituencies and to contribute to creating a new kind of society with unique structural elements - a knowledge society. The challenge for researchers and scholars is therefore to treat seriously both structure and agency, and to recognize that both always operate even if one chooses to concentrate on only dimension.

The purpose of this essay is to set the information revolution and knowledge society into a more conceptually and theoretically rich context than is usually the case, by offering some definitional refinements and theoretical propositions that capture important core elements of human agency, in this case by focusing on the nature of cross-sectoral leadership in the transformation of information and communication activities.

### **Definition of the Knowledge Society**

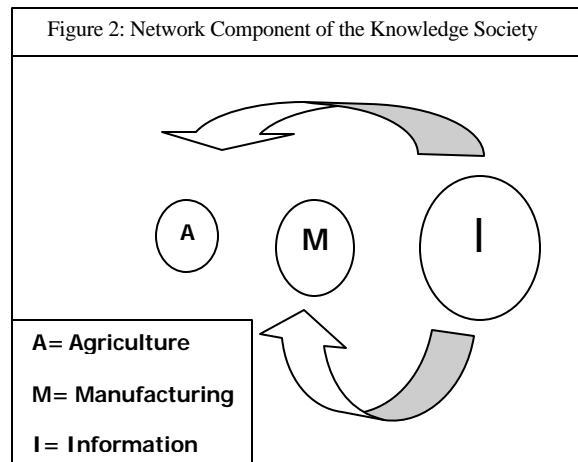
The knowledge society is usefully understood as an ensemble of three more or less interconnected components - structure, distributed networks, and patterns of inter-elite interaction. I recognize there are other secondary components of the knowledge society such as culture, but in this essay I concentrate on these three which are most central. By structure I mean the underlying sectoral composition of the economy,

specifically the balances among agriculture, manufacturing and information activities. In this sense the emerging knowledge society differs in fundamental, long-term ways from earlier societies - *the agricultural and industrial sectors shrink* (as do the work forces associated with them), while *the information sector expands* (Bell, 1973; Steinfeld and Salvaggio, 1989; Shepherd, 1979). (See Figure 1) The second aspect of the knowledge society is the network component. I define these networks as the steady roll-out of *distributed, interactive technology – enhanced channels of human communications through which knowledge is created, distributed and employed over wider and wider social and geographic spaces.*<sup>2</sup> (See Figure 2) The Internet and its associated distributed technologies play the central role in enabling these distributed communication networks. The rapidly expanding knowledge networks generate tremendous efficiencies for those connected (Metcalf’s Law) but also impact seriously on economic access and social equity (Wilson, 2003).



<sup>2</sup> See discussion on social networks in Smelser and Baltes, 2001. For structure and networks, see Marsden and Lin, 1982. The literature on ‘social capital’ is also a rich source of analysis of networks, see Portes, 1998. For social networks of private sector actors see Baker, 1994; Baker and Schumann, 1992; Baker, Nohria, and Eccles, 1992. See also Arquilla and Ronfeldt, 1999 for networks in their security implications; Barabasi, 2002 describes the broadest intellectual context of networks and network effects.

The third element of the Knowledge Society is a particular form of *interactive, cross organizational networked leadership concentrated mainly within the ICT sector* itself. I have reported on research (Wilson, 2003) that found that the Internet and other ICTs were most successfully diffused where there is a particular pattern of four sided leadership which I termed ‘Quad’ leadership. In this essay I expand on this third element – inter-elite leadership.



I do not claim that these three – structures, networks and elite “Quads” -- are always perfectly integrated into a coherent social ensemble. The degree to which they combine to constitute a distinct social phenomenon is partly an empirical question in any given country, and partly a theoretical construct related in the first instance to structural determinants like the level of GDP per capita (the higher the GDP per capita, the more likely that a knowledge society will exist). However, I do claim that these three elements provide a starting framework to explicate the emergence of knowledge societies around the world, and that the three do become more tightly linked through time.

## **Defining the Quads Conceptually and Theoretically**

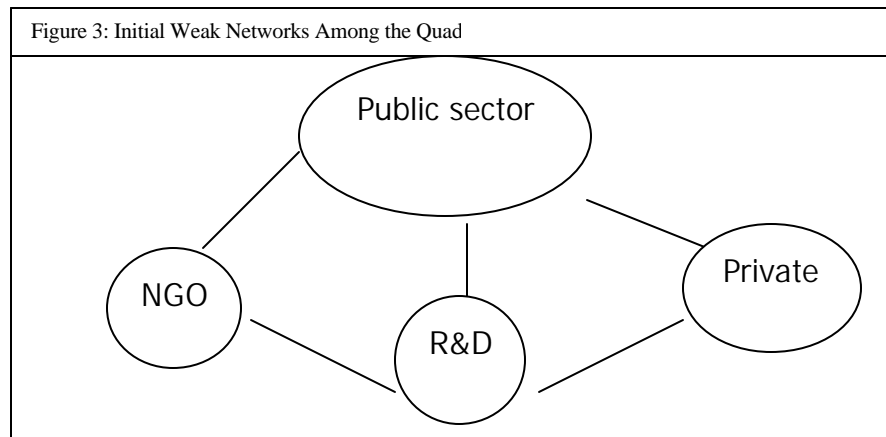
I suggest that a useful analytic framework to understand the extent, depth and distribution of ICT diffusion in the contemporary period is what I term a ‘quad’. This is a useful heuristic to direct scholarly attention to a still emerging, inchoate pattern of social interactions among Internet pioneers. There are of course a variety of models that also describe inter-institutional elite interactions in advanced capitalist societies, from “iron triangle” to “policy monopolies” to elite “interest groups” (e.g. Halperin et al., 1992; Baumgartner et al., 2000; and Berry, 1989). Bratton and Van de Walle (1997) describe elite-elite and elite-mass interactions in poor countries. Etzkowitz and Leydesdorff (2000) conceptualize networks of innovation in more aggregated terms of a “triple helix” in their article. The quad framework however gives greater attention to individuals and not just sectors, and provides other additional elements such as the play of institutional interests and capacities.

Let me point to the term’s conceptual, theoretical and empirical dimensions.

### **Conceptual Outlines**

Conceptually ‘quad’ refers to persistent four-sided networked interactions of small groups of elites across four sectors of the political economy – government, private sector, research centers and NGOs. It is particularly prevalent in societies in transition to a knowledge society. The following simple illustration captures the basic architecture of the Quads. (See Figure 3)

## Network Component of the Knowledge Society



All quad networks share at least five common dimensions, even as their relative balances and precise forms will differ from country to country, and from time period to time period within a single country.

- 1) The *regularity* of interactions among the players, or nodes. Are interactions intermittent or regular?
- 2) The *diversity* of the interactions. Are they truly four-sided, or merely bi-lateral or trilateral?
- 3) The *multi-directionality* of the interactions. Does influence flow mainly from one powerful actor to the others, or is it interactive and balanced among the network nodes?

In addition to these three 'external' network elements there are at least two conditions within each Quad which affect its interactions. These include:

- 4) The *internal coherence and cooperation* among the members that make up the Quad node (e.g. the private sector consists of small and medium sized enterprises

and large ones; of local and multinational enterprises). Are the actors inside the sector able to aggregate their interests sufficiently to speak and act with some commonality? What is the balance between cooperation and conflict?

- 5) The *openness* of the Quad actor. Is the leadership group of the sector secretive and closed, or open to exchanges with other potential partners?

Taken together, these five elements constitute the underlying *social architecture* of the Quad network.

What brings the Quad network together and sustains it? What convinces people to participate in the diffusion of the Internet (and more generally, in the construction of a knowledge society)? The social glue holding the four-sided network together is the actors' pursuit of their own individual rational self-interest through strategies of cooperation (Riker, 1990). Self-interest for the early innovators, the "Information Champions", encompasses ideal, material and institutional interests. In the pursuit of these varied interests they enter into a variety of multisided relationships. For example the early IT leaders are mostly ideological "do gooders" anxious to bring the benefits of the Internet to their people (Wilson, 2003). Many are academics unattached to big corporate interests. But they also want to maintain (if not advance) their narrow professional interests, and to achieve their goals they seek allies. Later, other institutional actors join the Quad network, and interests change.

The Quad concept rests on several key assumptions. Its potential members come together pursuing overlapping and intersecting, but not identical, goals. Entrepreneurs and social activists will have very different interests in Internet diffusion, but they may find common, collective benefits when they ally with one another. Whether they do so or

not is partly an empirical question, since there are negative as well as positive incentives to cooperate. Part of the group cohesion also originates in the inevitable external opposition that other interests bring to bear *against* the initial champions by individuals tied to the current information elites in the domestic state owned monopolies – such as the incumbent telephone company or state radio. Quad members constitute an incipient counter-elite (Armstrong, 1973).

A second assumption is that the social network “architecture” underlying the Quad of any given country is not permanent, but is typically fluid and evolving, especially in its early period. Furthermore it will be subject to constant renegotiations among the partners (Etzkowitz and Leydesdorff, 2000). The precise degree of permanence needs to be analyzed and demonstrated empirically.

Third, the four potential nodes in the Quad architecture are never internally homogeneous, and as such there are always cleavages and ongoing struggles within each for dominance and influence over the terms of knowledge society expansion.

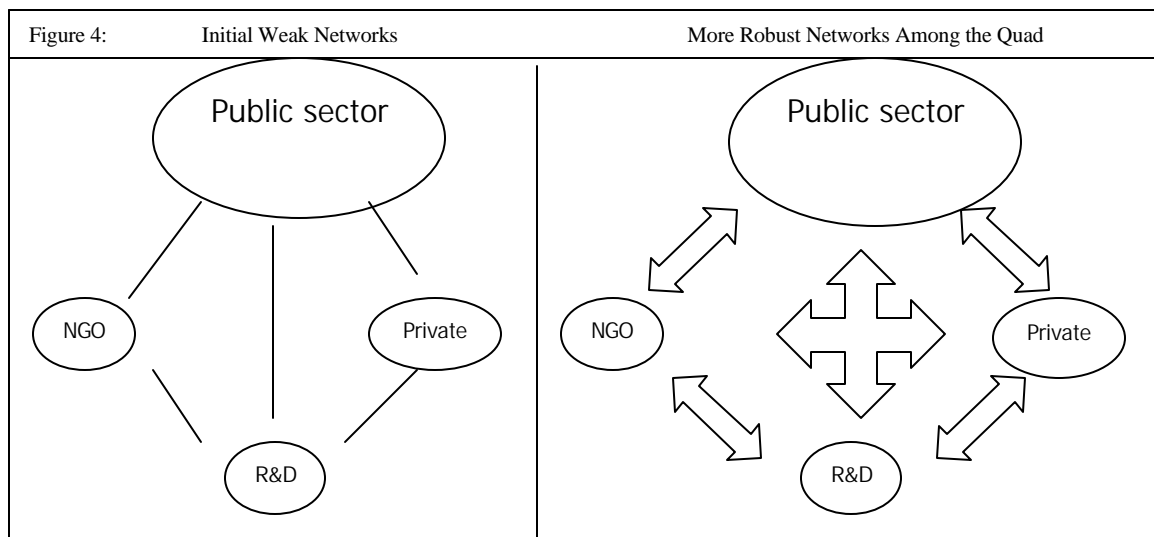
A fourth assumption is that these actors eventually become acutely aware of their own positions in this dynamic, multisided network and craft strategies that reflect their awareness. Different actors hold different views of the network, its precise structure, and its utility; and they often differ on how Internet diffusion should proceed – i.e. under whose ownership and control. Yet at some point key actors realize the networked nature of this project; that is, their own (strategic) behavior hinges on their assumptions of the most likely behaviors of the other actors, both allies and opponents.

Finally, these transformations occur when individuals acting alone and in small groups, driven by their material and ideological interests, act politically to restructure

their access to, control over and ownership of information and knowledge resources, a process I call “strategic restructuring”. In all settings this involves a number of political activities like lobbying, organizing constituencies and re-writing rules, including restructuring institutional incentives, changing property rules and altering regulatory requirements. Over time these strategic restructurings create new institutions and radically reform existing ones.

Comparative research conducted by this author in Asia, Africa and Latin America found that the original architecture and dynamics of the Quad relationships changed consistently over time in a similar direction, though not with the same pace or scope. In terms of the dimensions cited earlier, in the early 1990s these inter-elite relations were mostly episodic and involved only a few bi-lateral relations, not fully fledged four sided relations. The public officials were by far the dominant players. Then, by the end of the decade, there were shifts and the Quad relations became more regularized, diverse, multi-directional and balanced, as other actors like researchers and then entrepreneurs became more active and assumed more leadership. The following figure illustrates this transition.

(See Figure 4)



Thus, there are predictable, patterned relationships within the Quad, and between the architecture of the Quads in any given country, and certain structural and institutional features of the country. There are also relations between social Quad architecture and ICT performance. This leads us to consider critical issues of causality and theory. What causes Quad architecture and what does Quad structure cause?

### **The Theory of the Quad**

One component of the Quad theory predicts causal relationships between the architecture of the Quad on the one hand, and the subsequent performance of the ICT sector on the other. More specifically, we posit that the more robust the architecture of the Quad, the better the performance of the ICT sector as a whole. One can make this hypothesis more pointed: the more robust the architecture of the Quad, the faster the diffusion rate of the Internet and the higher quality of the Internet network in any given country. Here “robust” means the Quad relations are regular, sustainable, balanced and multidirectional among the actors. The actors are able to reach common agreement on their preferences and are open to ties with other parties. By contrast, countries with weak, non-robust Quads will have ICT sectors where Internet diffusion is slower, market penetration is weaker, the use of the technology is less sophisticated, and other features of performance will suffer. Put most simply, the theory predicts that “the better the Quads the better the ICT performance.” The worse the Quads, the worse the ICT performance. In this first formulation, the architecture of the Quad is the independent variable, and the performance of the ICT system the dependent.

There is a second important element to the theory about the relationship of the Quad to the society in which it is embedded. Here, the causal arrow goes from society to the Quad, which is now the dependent variable.

Not all societies are identical and therefore we expect their Quads to differ in ways that are regular and predictable. Quad architecture and dynamics will manifest elements of societal structure and macro-dynamics. The Quad theory predicts that least developed countries have least developed Quads, and developed countries have more developed and robust Quads. Thus, the lower the GDP per capita, the less robust the Quads; the higher the GDP per capita, the greater the regularity, diversity, balance and multidirectionality of the Quad. Another plausible independent variable that may shape Quad architecture is national institutional forms, such as whether a country possesses a unitary or federal system, or a tradition of extensive or limited government economic regulation, an argument parallel to the Levy and Spiller's (1996) about inter-institutional regularities. For example we might hypothesize that the more centralized a nation's institutional arrangements, the more centralized the ICT Quad. In this theoretical formulation, the Quad is the dependent variable and GDP/pc and perhaps other structural features like political culture (i.e. norms of authority, participation and obedience) are the independent variables. Confirming or disconfirming these relationships authoritatively will require additional field work, but these relationships appear to hold as described.

Let me return directly to the issue of leadership in the four-sided network. From a highly macro and long term perspective, the evolution of the Quads may appear to take place automatically, on their own. On closer inspection, however, we find that the pace, direction and substance of Quad development occurs through the deliberate interventions

of strategically placed individuals able to mobilize material and political resources to achieve the outcomes they seek (Wilson, 2003). It is a relatively small set of “information champions”, of social entrepreneurs, that act individually and collectively to construct these social networks initially. They anticipate and plan, but as often they respond on the fly to institutional incentives and structural cues in their environment. They also respond to and anticipate the strategic moves of other individuals within and across the relevant social institutions where the information champions -- and their opponents -- are most likely to be found.

While each of these individuals is unique, and possesses unique motivations and skills, nonetheless there are common elements to the kind of individuals who typically lead in the creation of Quads, and these new leaders typically pursue similar strategies in all countries. Indeed, there is a small but growing scholarly literature on the new ‘e-leadership’. It is mostly restricted to studies of the private sector (e.g., Annunzio and Liesse, 2002; Hargrove, 2001; Mills, 2001) and emphasizes, in Hargrove’s terms, “reinventing leadership in a connected economy”. These and more traditional leadership studies remind us how multi-dimensional is the new leadership, shaped by many social forces that change through time. In the ICT field especially, timing is everything, and the information champions arrived on the scene in distinct waves. Many of the first wave champions of the early 1990s are the sons (and some daughters) of professionals, neither very rich nor very poor, and most have studied abroad. They are ambitious within the ranks of researchers and professors but few of the first wave were interested in making money in the exploding IT market. A second wave of government officials got involved

with new ICTs, followed by a third wave of private sector entrepreneurs who were ICT enthusiasts but also wanted to make money (Wilson, 2003).

This conception and theory of the Quad complements and extends other existing models of innovation and diffusion. For example, the insight and careful research of Rogers (1995) demonstrated convincingly that across a variety of areas, the development, acceptance and diffusion of technology is led by relatively small percentages of the population. His categories of diffusion – innovators, early adopters, late adopters, laggards – entered the lexicon of IT penetration around the world. What his work and that of most others omits, however; is the precise set of institutional incentives and societal processes through which individual innovators and early adopters achieve their goals. It is this conceptual and theoretical gap that the Quad framework seeks to fill.

### **Members of the Quad**

In the developing and developed countries which have enjoyed some successes in making the transition toward a knowledge society, often in particular regions like California's Silicon Valley or Bangalore in India, the leaders from these different sectors have been able to connect consistently, to 'network' and work cooperatively, each community of interest bringing to the mix its own strengths and resources.

**Public Sector:** The *public sector* usually leads the pack, especially in the early phases of successful transitions. Public sector leaders represent institutions with authority, legitimacy and stability, elements sorely needed during the transition. It includes ministries and regulatory bodies. Local and national governments provide and

usually control critical infrastructures that provide the backbones of the information revolution. In addition, public leaders historically have been able to mobilize the large amounts of capital required for ICT and collateral infrastructures. And not to be underestimated, democratic political leaders can legitimately claim to speak on behalf of the common good, and to speak for all citizens, not just consumers or suppliers or members of one or another interest group. At their best, they represent the interests of all. At the same time, government leadership has weaknesses, especially during this knowledge transition -- governments and their leaders are usually slow, bureaucratic and risk-averse. They may also be corrupt.

Private Sector: In the *private sector* we find that the reverse characteristics of speed, flexibility and ingenuity in leaders are highly valued and rewarded. It is the private sector that is the source of ICT innovation, dynamism, and finance during the transition. Private sector leaders also bring a sense of urgency to their cross-sectoral discussions, a need to move quickly, that other leaders often lack. They are more concerned with the efficiency with which resources will be used in the transition. But private leaders in LDCs often suffer from the local perception that they are selfish and illegitimate. They often have short-term orientations geared toward the next quarterly report, not to long term development. Equitable distribution is rarely their first concern. In the poorer developing areas like much of Africa, powerful local private sector leadership is virtually non-existent.

Research and Development Communities: In countries like China, Brazil and the U.S. it was the leadership in the *research and development communities* that first led the charge to make the Information Revolution. It was not the top government leaders, nor

the captains of local industry nor multinational capital that launched the revolution; rather, it was risk-taking visionaries from the Chinese Academy of Sciences or the Ministry of Science and Technology in Brasilia or the research labs of MIT and CALTECH that launched China, Brazil and the U.S. toward their versions of the knowledge society. These leaders led beyond the lab; they mobilized the interests of their counterparts in government ministries to join them in their quest for wider use of ICTs. They were the creators of new knowledge, and the best of them led others to see the potential of the new technologies to improve the economic, political and social lives of their fellow citizens. However, most lacked the urgency to act quickly, and in many if not most LDCs the universities and labs were notoriously underfunded and easily ignored.

Civil Society Organizations: In Brazil, the first non-research, public access Internet service provider (ISP) was created not by a private entrepreneur or researcher, but by a *Non Governmental Organization* (NGO) called IBASE. In South Africa, NGOs have been important players in designing public access and credit strategies for underserved black communities (Horwitz, 2002). In Bangladesh local cooperatives launched radical experiments through which women rented cell phones and sold telephone minutes to their village customers. NGOs usually are familiar with the grass roots and the 'demand side' of the market. They have practical local knowledge about local conditions, and just how social innovation proceeds (or not) in rural areas. While not as central to the process as governments, businesses or researchers, community and NGO leaders often have their ears to the ground more effectively than the others. But other leaders often shy away from them because they are seen as lacking widespread legitimacy, and can be a nuisance to local politicians.

NGO, research, private and public leaders all provide unique types of value added which they can bring to an inclusive national dialogue about the transition to a new kind of society. Yet, while it is true that each kind of leader can contribute uniquely to the transition, one should not be naïve about the difficulties involved. There are huge transaction costs, substantial barriers to greater and more effective communication among ICT experts in the diverse sectors. Each leadership group has its own styles and unique constituencies. Each is a distinct culture – think of the ‘cultural’ gaps – if not disdain -- between private capitalists and government bureaucrats in many countries. Precisely because these four groups typically lack shared experiences working side by side for a common purpose on the basis of equality, creating a sense of community among them is neither easy nor automatic. It requires a lot of hard work and a special kind of leadership engagement.

Nor should one be naïve about the motives for cooperation or conflict. All countries in the world demonstrate substantial inter-elite cooperation and learning. There are always close personal and professional ties within the national elite. Sometimes they yield fruitful and productive relations, with positive sum outcomes for all concerned. But sometimes they are simply entrenched channels for corruption, or for narrow patron-client ties with little public good (e.g., Bardhan, 1997; Johnston, 1997).

However, the kind of four-sided cooperation I call for is qualitatively distinct from traditional forms of interaction. The updated ‘quad’ leadership I suggest is not universal – each country must define its parameters for itself. In West Africa the Senegalese or Ghanaian patterns will not be the same as East Asian patterns. Indeed, the Ghanaian pattern of ICT leadership relations is very different from the Senegalese

networks with the latter much more interactive and cooperative. In China, for example, the term '*guanxi*' is widely used to describe a system of intimate social connections up, down and across Chinese society (Lieberthal, 1995, 1998). It operates up and down the social ladder, and across the 'gray areas' of under-defined rules that typify much of modern China's political economy. Traditional authority patterns overlaid with the patterns of a 20<sup>th</sup> century authoritarian, closed industrial society rarely encourage the consultative relations required of 21<sup>st</sup> century knowledge societies. While *guanxi* can have its good points for social cohesion, needed is a more transparent and regular system beyond *guanxi*. There is another term in Mandarin that better captures this idea, drawn from the Chinese characters for interconnected people. Appropriately, these are also the core characters of the Chinese ideogram for Internet – "*guo lin wan*".

### **Examples of Quad Leadership**

Let me briefly illustrate the role of 'Quad' leadership and the complex and often contradictory intersections of structure, networks and politics. My first example is drawn from two West African countries, Ghana and Senegal, where I have conducted field research. Experts agree that the greatest single predictor of ICT penetration rates is a country's GDP per capita: in general the higher the GDP/PC, the higher the penetration rates. Yet whereas Senegal's GDP p/c is only about one third greater than that of Ghana, its telephone penetration rate is three times higher, and its Internet penetration rates are even higher still. In other words, Senegal's actual ICT performance exceeds what its economic structure would predict. Certainly, there are some important structural

differences between the two, not the least of which is different colonial heritages (Senegal is a former French colony; Ghana was a British territory). Still one likely explanation for the disjuncture probably lies in their different Quad leadership patterns. Networks and leadership help explain the differences.

Both countries are poor, but both have some forward looking leadership elements trying to accelerate their knowledge transition. In my experience in visiting and researching both countries I have found that a visit to interview ICT experts is relatively easy in Dakar. On each occasion I am able to contact a colleague in government or research who is able to quickly set up a meeting with a sizeable group of his colleagues who are active and expert in ICT matters. Typically we meet at one of the leading cyber cafes that also serves food on its open-air roof top restaurant, and there we are joined by representatives from government, from ISPs, trade associations and the universities. The interactions are friendly and everyone share ideas, gossip and hot tips. By contrast most of my visits to Ghana consist of serial meetings to interview first the leading ISP, then other ISPs, then government officials and forth. I conclude from several years of observation that in Senegal, the university, private, public, and NGO communities meet frequently and in trust<sup>3</sup>. The Senegalese have established and maintain informal and formal networks that carefully develop ‘social capital’ among their members. Their Quad leadership is effectively in place. The social relationships among the four sides are frequent, dense and well established. In Ghana, on the other hand, other researchers confirm that representatives of the four sides rarely meet together as a group, and when they do the levels of trust seem lower than in Senegal. The two countries have different

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<sup>3</sup> Trust is an essential element in building a knowledge-based, learning organization. See also Fukuyama, 1995.

“Quad” relations. These differences may well yield important differences in ICT performance.

Let us consider another paired comparison where leadership and patterns of elite interaction may influence outcomes, this time contrasting China to India. Here too we get curious contrasts that probably reflect domestic authority structures and Quad leadership, since like Ghana and Senegal, the two countries have very similar sectoral structures.<sup>4</sup> With economic structure so similar, it would be difficult to predict a priori which country would have better ICT diffusion. China’s GDP / pc is now 72 % higher than India’s, but India is reported more democratic (2001 figures from the CIA World Fact Book). Kedzie (1997) and others demonstrate how closely Internet diffusion tracks democracy. So while their economic levels per capita are very similar, India is much more democratic than China and hence Kedzie and others would anticipate wider Internet diffusion there. Yet democratic India’s Internet penetration rates are four times *lower* than authoritarian China. These differences I argue reflect the relative degrees of cooperation among elites across the core four sectors in two countries: cross-sector relations in India have been historically less cooperative than in China. Ministry civil servants, researchers and business leaders have not been close, with a few localized exceptions like Bangalore, where ICT expansion has been far more robust.

The Chinese national political elite has been hugely effective in mobilizing the government, research and state enterprise leaders to cooperate across institutions and sectors, and has achieved one of the highest rates of telecommunications diffusion in the

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<sup>4</sup> In India, the GDP composition by sector for agriculture, industry and services is 25%, 26% and 49% respectively. In China, the GDP composition by sector for agriculture, industry and services is 18%, 49%, and 33% respectively (2001 figures from the CIA World Factbook).

world – they have added more fixed lines than the rest of the developing world combined (Wilson, 2003). With 46 million Internet users, they are second only to the U.S. in the total, though the percentage rate at 3% is low, and they are number one in mobile telephones globally. They have also been successful in producing low cost (but not always the highest quality) hardware applications.

Let us call phase one of China's Information Revolution the period when leading technology experts from the Chinese Academy of Science (CAS) and universities like Tsinghua convinced counterparts in ministries of education and of science and technology to support Internet diffusion, which they did through a series of projects which linked like-minded people in research, university and government authorities. Eventually the growing insistence of the technocratic elites percolated up to the political leadership, which began to emphasize science and technology more and more. Segal (2002) quotes local Chinese reports that find build up of rich social networks of exchange that made the spread of independent science and technology enterprises possible.) Eventually, state enterprises like China Telecoms accelerated the build out of its network, and the performances of the sector skyrocketed. In China the central political elites under Deng Xiaoping, spurred by their relative backwardness and ambitions, and dedicated cross-organizational communications, grew firmly committed to pursuing a strategy of Informatization. In their command economy, they also had the authority and the organizational tools to do so.

As China of necessity expands from emphasizing hardware and hard infrastructure for domestic markets, to produce sophisticated software for local and global markets, it is unlikely that the net benefits to the society can be sustained if the

current national Quad leadership does not quickly diversify itself even further to incorporate more private sector leaders, especially of small and medium sized firms. Creating cutting edge software is not easily developed through a top down command economy. Furthermore, as the intellectual energy and creativity of the country diversifies in the transition toward a knowledge society, it is certain the current leadership will need increasingly to co-opt the non-state, non-profit civil society leaders as well, such as those from the incipient NGOs. Will China be able to diversify and restructure its “Quad Leadership” network to sustain a transition to a more flexible and innovative knowledge society? Only time will tell.

### **Conclusion**

The principal point of this essay is that successful transformations of today’s industrial or agricultural societies into the knowledge societies of the future require new kinds of leadership. This leadership must draw from the ‘best and brightest’ across at least four societal sectors if the transformations are to be successful – public, private, research and civil society. This model of cooperative, networked leadership, which I called ‘four sided’ or ‘Quad’ leadership, emerges initially as a negotiated network of like minded individuals who seek to advance liberal ICT diffusion. When successful these individual and collective negotiations eventually create distinct but socially interconnected nodes of contact, or networks. Although I did not describe it in this essay, these distributed networks in turn may facilitate structural transformations of the balances among the basic economic sectors, and they may elaborate more flexible societal

networks which create the basis for subsequent innovation and further elaboration of technical, infrastructure-based networks.

Networked ‘Quad’ leadership provides qualities that more narrow individualistic leadership patterns cannot – especially better, more regularized and more efficient access to the core resource that is re-shaping modern society – knowledge. It is timely, accurate and relevant knowledge -- technical, economic, societal – that is the life blood of the modern economy. Today, knowledge and the powers that flow from it are not kept in one place – in a bank vault, or gold mine or President’s office. Rather, knowledge – not information - is literally kept in the heads of knowledgeable people, and in the networks and virtual storage sites that support them. Today’s successful nations are those able to get timely access to and act upon useful knowledge across many distinct communities when, where, and in the form they need it (Dahlman and Aubert, 2001).

This kind of regular interaction through the ‘Quad’ can provide more than mere “information”; it provides decision-makers a greater sense of context, interpretation and meaning that they need to make wise and informed decisions to advance their organizational goals. It is only with these elements that true innovation is possible.

To achieve these goals, some critical fraction of the national leadership must be willing to step forward and take on the challenges identified at the opening of this essay: to change structures; to create new knowledge networks; and to negotiate and create a sustainable coalition among the different groups, institutions and constituencies.

*‘Quad’ Leadership is Needed to Achieve Structural Changes.* An essential task of effective leaders today must be to maintain the long-term vision of their end-point

destination – creating the knowledge society. Leaders must keep central to all national endeavors the achievement of the big structural changes required for a knowledge society. They need to facilitate massive resource shifts away from some industries, sectors and even communities to other industries, sectors and communities. They must oversee massive capital investments in knowledge producing industries and infrastructures. This requires leaders able to mobilize substantial and expensive economic, financial and other resources to midwife the birth of the new society. This is a **long term** structural project, requiring leaders to keep their eyes on the end game.

*Quad Leadership is Needed to Create Knowledge Networks.* Very few societies have ever successfully built out dense, widely distributed networks of ICT infrastructures, and the soft human networks necessary to design, build and sustain them. This is a difficult challenge in which even the most economically advanced countries like the U.S. or Sweden are only at the entry point themselves, relative to the long road ahead. One IBM executive says we are only five percent into the Information Revolution. The wireless and wired infrastructures, the regulatory and legal frameworks, the financial markets and venture capital firms, the new kinds of knowledge centers like science and technology parks or national research centers are created through cross sectoral leadership that can bring together once-isolated institutions to work cooperatively through new networks toward common goals – to create, distribute and acquire useful knowledge (e.g., Etzkowitz and Leydesdorff, 2000). This assumes that elements of the social architecture will shape the subsequent technical architecture, as individuals and groups use their positions in the one to elaborate and enhance the other. This is a **medium-term** exercise

that creates brand new distributed networks, as well as reforming, extending and deepening existing systems of knowledge exchange.

*Leadership is Needed to Sustain the Quad.* These relationships are partly determined by existing structures and institutions, but once in place they must be consciously nurtured and protected. Some leadership elements must step forward to invest considerable time and the energy required so that the potential partners will find it worthwhile to continue to participate. This exercise of vision and resource mobilization through short term selective incentives and long term goal setting is a classic challenge of collective action (Olson ,1965).

*Leadership is Needed to Negotiate and Mobilize Political Support for Progressive Social Change.* The medium and long term goals which leaders strive for can only be achieved if they are able successfully to mobilize material and especially political resources in the **short term**. Leaders must build pro-reform constituencies and coalitions by demonstrating the potential benefits of the transition to those most likely to receive them; by neutralizing the harshest opponents; and trying hard to convince the vast majority of the population who will waver between opposition and indifference to the transition. Enhancing the likelihood of a more equitable outcome is a big part of making the transition successful over the medium and long terms. Leaders in developing societies must thereby manage step-by-step the series of short-term actions that impact equity and efficiency, and which, taken together, can become medium and long term transformations. Earlier experiences with transitions from communism to capitalism in

East and Central Europe demonstrated the imperatives of sequencing reforms so as to develop political support and neutralize political enemies.

Achieving these tasks places special and challenging responsibilities on each of the four members of the Quad.

Senior government officials must agree to curb their own powers and prerogatives in the name of greater national progress. As unlikely as this seems, Vogel (1996) has demonstrated through his studies of privatization and other reforms that leaders do sometimes restrict their own power. As the most powerful players on the national scene, government must take the lead. Top officials must be the first to open up, creating advisory councils and consultative bodies that draw on the expertise of private business people, the knowledge of grass roots leaders, the innovations of researchers. They also need to accept some of that advice, and not just listen politely, pretend to consult and then do precisely what they would have done anyway. Government officials need to resist the temptation to invite into their councils only representatives of large and powerful companies, and the most visible and politically reliable of their business allies. The future will hinge on the ability of government officials to heed the interests and ideas of their small and medium sized entrepreneurs as well as larger firms. This is where most new jobs will be created, and will be an important source of innovation.

Private sector leaders for their part must learn to be more aggressive in articulating their unique contributions to creating the national knowledge society. Local businessmen often can make this case more persuasively than multinationals, but both should be involved. Foreign firms can import the most advanced technologies. Businessmen must look beyond their own narrow interests toward the aggregate national interest. They must

organize themselves internally to be more effective spokesmen. Their own business interest associations must learn to develop effective position papers and studies to advance 'Quad' leadership and accelerate the transition (Doner, Ross-Schneider, and Wilson, 1998).

The research and development community in most LDCs is usually quite fractured and divided. Research funds are scarce, and not always well channeled. The supply of studies may not always match the needs of practitioners in the public and private sectors. Scholars so inclined must find better ways to see that their individual research activities mesh with the actual and articulated ICT needs of other groups in society. Also, the results of their studies must be clearly expressed and well-distributed to attract the attention of potential users and funders.

The Non-Profit leadership has perhaps the most difficult task in seeking wider participation in the decision-making process guiding the transition. In most LDCs it will be the weakest partner, and frankly has the least to contribute to policymaking in the short term. Nonetheless, NGOs can provide special perspectives on grassroots development unavailable to the state, and knowledge unavailable to most academic researchers. They can also provide unique channels for implementing ICT strategies. Their challenge, like business, is to create better internal mechanisms to capture and mobilize their own unique knowledge and be able to bring that knowledge to the policy table (National Research Council, 1996).

In coming together to create new constituencies and to form a new interactive, distributed leadership for an interactive, distributed society, the new leaders must also retain some modesty. Their role is especially important in this initial turbulent period, but

their ultimate success in creating a new kind of society hinges on their ability to translate today's vision and commitment into tomorrow's institutional and regulatory reforms sustainable over the long run. The new leaders must make new pro-innovation rules and embed them in re-designed institutions. These include new rules governing intellectual property rights, new arrangements for life-long learning and training, and even new rules of trade and investment. The future knowledge society will require new institutional forms that can guide both broad strategic directions, as well as the tactical implementations that must occur along the way. Inevitably, this means democratizing relations between leader and the led, as well as laterally among elites. In other words, the new 'digital leadership' is important to the degree it creates sustainable policies through *legitimate*, efficient institutions imbued with purpose and vision. Ultimately it is the institutions and long-term constituencies that will sustain the transition beyond the tenure of any single leader. In the medium to long-run, leadership is not a substitute for the many varied elements required of a modern, equitable and open knowledge society. But in today's world at the start of this global transition, leadership is certainly the most central element.

## References

- Abbate, J., 1999, *Inventing the Internet*, MIT Press, Cambridge, MA.
- Annunzio, S., Liesse, J., 2001, *e-Leadership: Proven Techniques for Creating an Environment of Speed and Flexibility in the Digital Economy*, Free Press, New York.
- Armstrong, J. A., 1973, *The European Administrative Elite*, Princeton University Press, Princeton, NJ.
- Arquilla, J., Ronfeldt, D., 1999, *The Emergence of Neopolitik: Toward an American Information Strategy*, Rand, Santa Monica, CA.
- Barabasi, A., 2002, *Linked: The New Science of Networks*, Perseus, Cambridge, MA.
- Bardhan, P., 1997, *Corruption and Development: A Review of Issues*, *Journal of Economic Literature* 35, 1320-1346.
- Baumgartner, F. R., Jones, B. D., and Macleod, M., 2000, *The Evolution of Legislative Jurisdictions*, *Journal of Politics* 62(2), 321-349.
- Baker, W. E., 1994, *Networking Smart: How to Build Relationships for Personal and Organizational Success*, McGraw-Hill, New York.
- Baker, W., Schumann, P., 1992, *Introduction to Network Analysis for Managers, Connections*.
- Baker, W. E., Nohria, N., and Eccles, R., 1992, *The Network Organization in Theory and Practice*, *Networks and Organizations: Structure, Form, and Action*.
- Bell, D., 1973, *The Coming of Post-Industrial Society: A Venture in Social Forecasting*, Basic Books, New York.
- Berry, J. M., 1989, *The Interest Group Society*, Foresman/Little, Glenview, Ill.

Bratton, M., Van de Walle, N., 1997, *Democratic Experiments in Africa*, Cambridge University Press, Cambridge.

Castells, M., 1998, *The Rise of Network Society*, Blackwell, Malden, MA.

CIA, *The World Factbook 2002*.

Dahlman, C., Aubert J. E., 2001, *China and the Knowledge Economy*, World Bank Institute, Washington, DC.

Doner, R. F., Ross-Schneider B. and Wilson III, E. J., 1998, *Can Business Associations Contribute to Development and Democracy?*, in: A. Bernstein, P. L. Berger, (Eds.), *Business and Democracy*, Pinter, London, pp. 126-151.

Etzkowitz, H., Leydesdorff, L., 2000, *The dynamics of innovation: from National Systems and “Mode 2” to a Triple Helix of university-industry-government relations*, *Research Policy* 29, 109-123.

Fukuyama, F., 1995, *Trust*, Free Press, New York.

Halperin, M., Scheffer, D., Small, P., 1992, *Self-Determination in the New World Order*, Carnegie Endowment for International Peace, Washington, D.C.

Hargrove, R., 2001, *E-Leader: Reinventing Leadership in a Connected Economy*, Perseus, Cambridge, MA.

Horwitz, R. B., 2002, *Communications and Democratic Reform in South Africa*, Cambridge University Press, Cambridge.

Johnston, M., 1997, *Public Officials, Private Interests, and Sustainable Democracy: When Politics and Corruption Meet*, in: K. A. Elliot, (Ed.), *Corruption and the Global Economy*, The Institute for International Economics, Washington, pp. 61-82.

Kedzie, C., 1997, *The Third Wave*, in: B. Kahin, C. Nesson, (Eds.), *Borders in Cyberspace: Information Policy and the Global Information Infrastructure*, MIT Press, Cambridge.

Levy, B., Spiller, P., (Eds.), 1996, *Regulations, Institutions and Commitment*, Cambridge University Press, Cambridge.

Lieberthal, K., 1995, *Governing China: From Revolution through Reform*, W. W. Norton, New York.

Lieberthal, K., Oksenberg, M., 1988, *Policy Making in China: Leaders, Structures, and Processes*, Princeton university press, Princeton, NJ.

Mansell, R., Wehn, U., (Eds.), 1998, *Knowledge Societies: Information Technology and Sustainable Development*, Oxford University Press, New York.

Marsden, P. V., Lin, N., (Eds.), 1982, *Social Structure and Network Analysis*, Sage, London.

Mills, D. Q., 2001, *e-Leadership: Guiding Your Business to Success in the New Economy*, Prentice Hall, Paramus, NJ.

National Research Council, 1996, *Prospectus for National Knowledge Assessment*, National Academy Press, Washington, DC.

National Research Council, 1998, *Internet Counts: Measuring the Impacts of the Internet*, National Academy Press, Washington, D.C.

Norris, P., 2002, *Democratic Phoenix: Reinventing Political Activism*, Cambridge University Press, Cambridge.

Olson, M., 1965, *The Logic of Collective Action: Public Goods and the Theory of Groups*, Harvard University Press, Cambridge.

Portes, A., 1998, Social Capital: Its Origins and Applications in Modern Sociology, Annual Review of Sociology 24, 1-24.

Riker, W. H., 1990, Political Science and Rational Choice, in: , J. E. Alt, K. A. Shepsle, (Eds.), Perspectives on Positive Political Economy, Cambridge University Press, Cambridge.

Rogers, E. M., 1995, Diffusion of Innovations, Free Press, New York.

Segal, A., 2002, Digital Dragon, Council on Foreign Relations, New York.

Shepherd, W.G., 1979, The Economics of Leadership Organization, Prentice Hall, Englewood Cliffs, NJ.

Smelser, N. J., Baltes, P. B., (Eds.-in-chief), 2001, International Encyclopedia of the Social and Behavioral Sciences, Elsevier, New York, vol. 15, pp. 10501-10516.

Steinfeld, C., Salvaggio, J., 1989, Toward a Definition of the Information Society, in: J. Salvaggio, (Ed.), The Information Society: Economic, Social and Structural Issues, Lawrence Erlbaum Associates, Hillsdale, NJ.

Useem, M., 2001, Leading Up: How to Lead Your Boss So You Both Win, Crown Business/Random House, New York.

Vogel, S. K., 1996, Freer Markets, More Rules, Cornell University Press, Ithaca.

Wilson III, E. J., 2003, The Information Revolution and Developing Countries, MIT Press, Cambridge.

World Bank, World Development Report 2002.

