Sustainable societal development in the knowledge based economy
– with special reference to regional analysis

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This analysis addresses sustainable societal development in the knowledge-based economy.[1] Currently, an important change is taking place in the international economy that has become known as "the new economy". The advances in information technology have compelled this change.[2] The main feature of the New Economy is the increasing influence of IT, which is changing the general organizational structure of business. One result is the increased importance of knowledge as a factor of production.[3] Also, through the facilitation of IT, in its basic role as a general technological paradigm, a new structure of high-tech and research-sensitive branches has emerged everywhere. These "new" branches have moved into the center of international market's affairs, while more "traditional" modes of production have declined or moved away from the highest developed countries. Taken as a total sum, it all added up to a major industrial revolution with great implications for all aspects of social life.

In the light of regional analysis, we shall investigate the question what difference the new industrial revolution has for the concept of sustainability. One thing, we can notice is that the new economy has a tendency to change the regional balance. The reason is that the expanding businesses of the new economy tend to grow out of an environment characterized by easy access to research institutions, highly qualified labour and knowledge-intensive support systems. The big cities were historically those places that facilitated this environment and consequently the new economy establishes its growth centers here. This tendency of favoring the cities has naturally considerable implications for the regional balance, since the balance will tend to shift to the disadvancement of the periphery at least within the initial stages of the process.

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[1] In this analysis, I will use the terms "the knowledge based economy" and "the new economy" as two interchangeable concepts.

[2] International Monetary Fund, *The Information Technology Revolution.* World Economic Outlook, October 2001.

[3] Dieter Ernst and Linsu Kim, *Global Production Networks, Knowledge Diffusion, and Local Capability Formation: A Conceptual Framework.* Paper presented at the Nelson & Winter Conference in Aalborg, Denmark, June 12-15, 2001.

One major indication of this process is the major change of demographic balance, which has happened in the Scandinavian countries during the 1990s.[4] In most of the Scandinavian countries, we have experienced a drastic emigration from the country toward the big metropolitan cities. What for quite a long time was considered a special Icelandic case has now become a broad Nordic pattern. This trend has created a new pattern of regional imbalance, which ultimately is threatening to erode the foundations of the most marginalized communities. Eero Holstila, who is the manager of a major program in the Helsinki Region has assessed that the expansion of the metropolis lies embodied in the imperatives of the global economy and that "the needs of the Metropolis will emerge with more vigour."[5] He predicts, "the current concentration and urbanisation process cannot be stopped and that it will continue, perhaps for up to 20-30 years."

Lars Olof Persson and Ola Nygren, who have work with prognosis of the development of the Swedish labour market, have also identified this tendency toward a concentration of forces. They predict that Sweden's labour markets around 2040 will have become reduced to around 40, from today's 109 and that most population's dynamic and industrial activity would have concentrated around three major city regions.[6]

Another important trend, which is a part of this picture, is the phenomenon of commuting. Commuting is not a new phenomenon but its volume has steadily increased and it has reached proportions, where it is challenging the classical concept of community and changes the meaning of local development. In the classical notion of community, we assume the concept of a place, where people both lived and worked, but how do you address the issue about local business development in a place where no one works in the first place?

The article is structured along the following lines. Section one analyses the general concept of sustainable societal development by defining its properties and discussing important elements of its conceptual framework. In section two some implications of the new economy are briefly discussed. In section three, the Danish case is outlined in order to show the concrete consequences of the new economy on the regional industrial balance. Section four discusses the strong importance of knowledge in the new economy and focuses on the strategic importance of the local knowledge base for innovation and competitive growth. The final session discusses how various variables might influence the future industrial development of tomorrow's rural districts.

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[4] Thomas Hanell, Hallgeor Aalbu and Jörg Neubauer, *Regional Development in the Nordic Countries 2002.* Nordregio Report 2002:2.

[5] Eero Holstila, "The Needs of the Metropolis Will Emerge with More Vigour." *Journal of Nordregio.* No.3. September. Vol. 1. 2001. pp.16-18.

[6] Jon P.Knudsen, "Swedish Labour Union Worried about Widening Regional Gap." *Journal of Nordregio.* No.2. June. Vol. 1. 2001. pp.5-6.

The main focus of this analysis is to clarify the theoretical framework of concept of sustainable societal development. In addition, this exposition will discuss how the current state of global transition provides an illustration of the problems of regional and local sustainability. For reasons of space-limitations, we cannot at this occasion go into a systematic discussion of the linking of the general theory of societal sustainability with that of regional analysis. In this approach, the discussion of regional development is one of illustration and preliminary analysis.

Naturally, the issue of ecological sustainability is very important for the analysis of sustainability as a general concept yet, in this article, I have chosen to bracken the issue for reasons of space limitations.

The concept of sustainable societal development

By the concept of sustainability, we shall define *a society's persistent capacity to reproduce itself on conditions, which are valid for the nature of the system.*[7] In the original debate of the concept of sustainable development as it was reflected in the Brundtland report (1987)[8] and later in the Rio Earth Summit declaration (1992),[9] it was emphasized that society should live in a certain persistent harmony with nature and within the quest of future generations; in the elaborate meaning of sustainability suggested here, it is equally implied that society should be able to live in harmony with its own evolving capacities.[10] Generally, the key

[7] By system, we imply any social actor may it be societies, communities, regions, or districts, which by any meaningful interpretation can be view as having the minimum conditions for an adequate self-sufficiency. From an empirical point of view, the difference between various types of actors is enormous; from a logical point of view, however, they can all be analyzed as systems. (It is a little like the game of chess. The empirical game of chess can be played in endless combinatoric ways expanding the whole scope of human imagination, yet still despite all complexity the rules of the game remain the very same).

[8] Obviously, the debate about "sustainable development" has no clear-cut starting point one could as well take the Club of Rome debate of 1972 as its "original" starting point. For a while the term was strongly associated with concerns with ecosystem and "green development" (including the contribution of William Mark Adams (1990)) yet, it was clear that sustainability naturally involved a conceptual base that addressed the whole context of society. For reasons of space-limitations, we cannot here go into an elaboration on the enormous scope of the historical debate on sustainable development. This debate is naturally, an ongoing enterprise latest articulated at the World Summit in Johannesburg in 2002. See, William Mark Adams, *Green Development: Environment and Sustainability in the Third World.* London, New York: Routledge, 1990.

[9] Another important statement was articulated in United Nation Development Program, *Human Development Report 1994.* New York: United Nation, 1994.

[10] We might argue that our harmony with nature is primarily a societal problem since our concept of nature cannot significantly become separated from the value-scheme by which we interpret our relationship to nature. In other words, our definition of nature is an act of society's own self-definition. In this way, the "ecological dimension" lies implicit in the societal. The concept of sustainability, I am using here, expresses an extended view of

question regarding sustainability is one of societal self-control. The operative goal of sustainability is to safeguard the *persistent* function of the pattern-maintenance of a system. A system is by definition not sustainable if the pattern maintenance system breaks down. A system, which general functions is a precondition for other systems, and which is essential for the reproduction of society, we will call a higher-level system.[11] A sustainable act always occurs within a system of higher and lower values.[12] Such a system is constituted through a system of societal prerequisites. The basic way, by which mechanisms of sustainability work, is by protecting the stability of higher-level systems by the regulation of lower-level systems. One crucial aim of the theory of sustainable development is to be able to codify the components of the general structure of higher-level systems in society, so that the hierarchy of control within the system is understood in its logical implications.

In the heart of the concept of sustainability lies the recognition that human societies only can prevail if they aim at a long-term balance between various inclinations of the system. Generally, to understand what a sustainable society is, is to understand *the intrasystemic hierarchy* by which a social system consists of a functional order of interactive subsystems. A deeper understanding of the factors of sustainability will coincide with the understanding of the logic of the intrasystemic hierarchy. The focal point for the concept of sustainability must be *a homeostatic situation*,[13] where the system operates within certain optimal boundaries both vis-a-vis its environment as well to itself. Whether the system is static, developmental or in "flux" has nothing to do with the question of the categorical properties of the system. To say that a system is "a process" without defining its constitutive categorical properties is to say nothing because a sheer "process" is a context-less declaration, which is an indication of nothing.

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sustainability but does not stand in contradiction to the concept implied in the Brundtland report. Hence, in the Brundtland report it was proposed "sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Naturally, it must be regarded as "valid for the nature of the system" to be able to nurture and safeguard its capacity to meet the needs of future generations both in regard to social as well as environmental issues. The aim of the concept of sustainability as it is suggested here is to develop a more generally theoretical framework for the analysis of the issue.

[11] In this way, what are higher or lower levels, is define by the differences in the functional importance of various operations of a given system. That a car has wheels is generally more important than whether it has automatic gears.

[12] A system without any value-differentiation would not be a system, where any sustainability problem could be identified or defined.

[13] Alfred E. Emerson, *Homeostasis and comparison of systems.* In Roy R. Grinker (ed.), Toward a Unified Theory of Human Behavior. Basic Books, 1956. Pp. 147-163.

Society has an objective side,[14] as well as a normative side. The same is true for sustainability. This means that no complete description of sustainability can avoid to take the community's own value-system into account – a value-system, which in the final analysis is cultural. Yet, at the same time sustainability is more than an act of "social construction," it is bound to a framework of objective necessity. In this way, the criteria of a sustainable system are on the one hand system-survival and on the other hand defined by the system's own cultural values. Both elements are important for the analysis of sustainability. A concept of sustainability defined solely as system-survival would be a blind mechanism without any direction. A concept of sustainability defined solely by a system's normative values would be the concept of direction without necessity. In this way, sustainability is more than just survival, yet, at the same time, it is also more than a normative wish list. The first (necessity) defines society's realm of possibilities, the latter (the norms) defines its realm of activities.

In this discussion, I would like to highlight the concept of societal sustainability. The concept should be clearly separate from that of economical sustainability. Hence, we will separate between economical sustainability and societal sustainability, which are two interrelated, yet, analytically distinct concepts.[15]

By *economical sustainability*,[16] we shall define a social system's capacity, through the arrangement of its industrial structure, to secure a developmentally sound equilibrium within the standards of production and exchange defining the order of the economic system.

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[14] By the objective side of sustainability, we will think (as a minimum condition) of those structures and activities of societies that is absolute necessary from the point of the system's survival. It is "objective" because there is no way to dispense from the performance of those activities. (A society cannot decide to stop "feeding" its population). The normative imperative is different; it refers to historical or "voluntary" conventions, which are not "necessary" in the sense they are not a universal property of system survival. (For the Amis, the special culture would not be sustainable if people began to drive cars yet the avoidance of car driving is obviously not a general condition for system-survival).

[15] One of the markers which establish the difference between economic sustainability and societal sustainability is that economical sustainability does not have to fulfill all aspects of the human need-structure in order to fulfill its function, it only need to provide an "income". In contrast, societal sustainability must, in principle, fulfill all essential functions of a community in order to redeem its quest for sustainability.

[16] Naturally, the economic aspect is a part of the "social sphere" by matter of definition. Still, the economy is generally viewed as a comparatively autonomous subsystem (within the general analysis of the social system) and within the capacity of its relative autonomy; it makes sense to regard it as an "independent" variable for analytical purposes. In many analyses within the international debate, sustainability are argued exclusively along economical lines and in these cases it is important to be able to compare the issue of economic sustainability with that of the societal, since sustainability of these two instances are not (necessarily) synchronized. This debate is particularly important because there often exist an inclination in the life of communities to "accept" pattern of economical development, which are highly problematic in regard to issues of long-term societal sustainability.

By *societal sustainability*, we shall define a social system's capacity, through the mechanisms of its institutional structures to be able to reproduce the system's basic features (cultural, social, demographic etc. etc.) in ways, which are optimal for the system's self-regulation and for the enhancement of its societal capacities.

By stressing the concept *societal,* I am highlighting the fact that the question of sustainability of a given community is not settled by economic issues alone but goes to the core of the functional integration of its social institutions. In the same way, we stress that sustainability is more than a quest for sovereignty and goes beyond those operations, which become an object of the political system.[17] Also by the term *societal*, we imply that the strength of a community is more than its capability to respond to stimuli from its environment but that it is embodied in its capacity to build-up deep-seated institutional structures around its cultural and cognitive orbit. Within the idea of "sustainability" lies the implication that a society must be able to maintain itself in its essential parts, so that the question of sustainability never can escape the question of *"the system"* in the meaning of the community as a whole. By stressing societal sustainability, we point to the *integral* dimension of the social system's general activities. In this way, when we are discussing the issue of societal development, we imply a concept of a *societal community*, [18] by which we indicate the core center of the elements of a society. The question of the integration of society is from an ontological point of view a persistent "problem" because there is no simple relation, by empirical linking, between the personalities of social actors and social systems.

Hence, by the concept *societal,* we are highlighting the idea that a community is a total facilitator of human life. So that the concept of community implies a place, where human life in principle can be satisfied in all its essential aspects. Consequently, for a society to become sustainable, it cannot just fulfill some isolated fragments of human life; it must be build around a structure, which sustain the whole human situation in its essential attributes. In this way, the issue of sustainability must be a mirror of the logic of society itself.

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[17] As Easton has maintained, the political system is a highly selective mechanism, which doesn't address, let alone obtain, all the basic processes occurring in the deep structure of society. David Easton, *A Systems Analysis of Political Life.* New York: John Wiley, 1965.

[18] By the societal community, we will imply that subsystem of society, where the values and norms of society are integrated in a common institutional structure that serves as the main source of obligations and orientation for the members of society. From an institutional point of view, the societal community is that core structure of society, where all the basic pattern of social orientation originates and returns. In this way, the societal community is that place, where all political and economic institutions of society originate. In this way, all the values, norms and institutions that characterized the economy and the industrial sphere must be regarded as specialized modifications of a foundational structure of institutions belonging to the societal community's arsenal of social forms.

Naturally, sustainability is a concept of *self-regulation.* A society with no inherent power to regulate itself would hardly deserve the title "sustainable." Hence, within the concept of sustainability lies the idea of a system that is capable of self-regulation. Self-regulation assumes self-control, which is ultimately attained when a society becomes a causality of itself. The original idea of *autarchy* embodies this imperative in its fullest sense, yet, in an open system, self-regulation can only mean that a system attains the most favorable position within an "external" equilibrium of many social systems. This does not negate the quest for autarchy but it removes its quest for a realistic accomplishment from the "outer" sphere of system-operation to the "inner" sphere. However, the capacity of self-regulation or "self-organization"[19] is not a capacity, which is equally distributed among societies or a "force", which exists as an automatic treasure in society. On the contrary, it is a result of its cultural history and therefore a capacity, which strengths are correlated with the "choice" of historical path. There does not exist any automatic "bullet-proofed" realization of a society's potentiality for sustainability; that is, sustainability is the resultant of a long historical accumulation involving the factor of institutional learning. This is not quite the same as saying that there doesn't exist any automatic stabilizing processes in favor of sustainability within the social system, however, these processes can only reach a high level of functional efficiency if they have past through a long journey of historical refinement. Indeed, if there weren't any automatic stabilizing processes in favor of sustainability inherent in society, then society's survival in history would be more miraculous than a miracle.

However, sustainability establishes a stronger claim than self-regulation. In the core of the concept, we find a reflection of the concept of *self-preservation.* In this way, the quest for sustainability emerges as a search for an operational understanding of the essential conditions for society's self-preservation. In the modern discussion of sustainability, where the factor of innovation is strongly highlighted, the idea of self-preservation is often discussed as a self-fuelling and *self-fertilizing* process, which is reflected in Luhmann's talk of "autopoiesis."[20] The question of self-preservation is complicated by the factor of development, not primarily because of the problems of system-adaptation but because of the need to understand the logic by which system-identity is revealed as an inner configuration of structural development.

Generally, development is a characteristic feature of society's mode of operation. Development raises important question about the "object" of sustainability, in the sense that the system of society is not an empirical fixation of itself but an actualization in time. In other words, a society's guest for sustainability is not

[19] W. Ross Ashby, *Principles of the Self-Organizing System.* In Foerster & Zopf (eds.) Principles of Self-Organization. New York, 1962.
[20] Niklas Luhmann, *Social Systems.* Stanford, California: Stanford University Press, 1995.

only measured by what it is but by the potentiality, it contains. Development, we shall define, *as the process by which a system actualizes the "program" of its structural potentials by a progression of its institutional capacities.* We use the concept "program" here in the way by which Ernst Mayr speaks about it in his discussion of "teleonomy."[21] The idea of a "program" has also some isomorphic similarities with Nelson and Winter's discussion of "routines"[22] although by "program", we imply a higher level of systemic control than that of organizational routines. Experience tells us that societies, which do not develop, will eventually move down the status-hierarchy of global societies and will eventually become marginalized and controlled by others until the point, where it has no scope of maneuvering. At least from the question of system-survival, the factor of development is an active component of sustainability analysis. Thus, if a system shall reproduce a pattern of purposive duration over time, it must be able to embody in its inherent institutional design a receptive capacity for the next level in the evolutionary differentiational order.

Development, however, has two dimensions, an "outer" and an "inner." The former deals with the system-environment interaction of society and the latter deals with society's interaction vis-a-vis the structure of its own value-system. In the first, it is bound by the necessity to situate itself within the matrix of resource allocation that is given by the international division of labor. In the latter it is bound to that "inner calling", which is embodied in its cultural codes. The Greeks spoke generally about the latter as man's "natural impulse" toward moral perfection. Indeed, history confirms that man has a "natural impulse" to perfect various institutions, products and technologies. "Natural impulse", however, is like a seed, which becomes "real" only under certain conditions and the main tool of these conditions are the *institutions* of society and their code of societal differentiation. A society can only embark on a sustainable development if it is able to satisfy both the "outer" and "inner" dimensions of its own system. In this sense, all societies are approaching a kind of double societal journey in evolutionary space. This journey takes form of navigation between the rocks of an outer and inner necessity. In this regard, Hegel has claimed that external forces are a "secondary necessity" and that the real necessity is embodied in culture.[23]

Successful levels of sustainability are strongly correlated with the community's capacity of creating an "organic community" through self-regulative processes. Yet, the notion of an organic community is by no means an inevitable condition since, the general globalization process is challenging this assumption

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[21] Ernst Mayr, *Toward a New Philosophy of Biology.* Cambridge, Massachussets: The Belknap Press of Harvard University, 1988.

[22] Richard R. Nelson & Sidney G. Winter, *An Evolutionary Theory of Economic Change.* Cambridge, Mass: The Belknap Press of Harvard University Press, 1982.

[23] Georg Wilhelm Friederich Hegel, *Lectures on the Philosophy of World History.* Cambridge: Cambridge University Press, 1975. (1830) p. 214.

every day. When we observe the processes of our modern civilization, we find trends toward a fragmentation of social life. Fragmentation reveals itself as a stepwise relativization of the bondage of "solidarity" in social life, so things occur within an atmosphere of disembeddedness and where boundaries between empirical systems become blurred. In the worse case, the fragmentations of social life might weaken the sources of social capital in a given community. Particularly, fragmentation might undermine the historically genuine nature of a community's demographic base and seriously weaken the historical depth of culturally codified knowledge.

The fragmentation of modern life is no accident, it is the implication that societies are open systems, which both import and export various resources and which are driven by an imperative in the industrial process, which rewards an increased mobility of the factors of production. One source of fragmentation is the fact that modern social systems increasingly are *interpenetrated* with each other; this creates a diffusion of the axes of solidarity, which makes it more difficult for each system to accumulate the necessary critical mass of societal commitments.[24] The facilitation of this mechanism is also embodied in the ideals of the Western world, which highlight the individual achievement and, hence, create a general structure of *institutionalized individualism*[25] as the main ethos of society. As a concept, "institutionalized individualism" signifies how the principle of the freedom of the individual person through various historical mechanisms has become a central axes for modern institutional life, not only by political and moral rights but also by the individualized of occupational role-pattern. The build-in pluralism of institutionalized individualism might negate Aquinas famous dictum that "in nature, government is always by one," unless of course institutionalized individualism is the one. Generally, the emergence of institutionalized individualism as a major societal "paradigm," must be considered as an institutional precondition of the high mobility of the factors of production, which are so characteristic for the developmental impulse of modernity. This increase of factor mobility is fuelled by the actualization of "human capital" and institutional individualism is both the expression and the condition for this process. As a consequence of institutional individualism, factors of production become increasingly dispersed, which not only result in a Hayekian disperse of knowledge[26] but also in the factors of power, authority and influence, while

[24] Measured by its original base of cultural solidarity.

[25] By "institutional individualism", we will define the inherent tendency in modern society to produce role-patterns that follow an institutional differentiation of social functions and which embody this process within the agency of individuals as the prime operative actor. It is "institutional" because the tendency toward "individualization" is supported by the internal logic of the differentiation process of modern institutions; that is, society itself promotes the role-pattern of "individuality".

[26] Friedrich A. Hayek, "The Use of Knowledge in Society" (1945). In Friedrich A. Hayek, *Individualism and Economic Order.* Chicago: University of Chicago Press, 1948.

organizational structures become increasingly horizontal[27], flexible[28] and less transparent.[29] Indeed, Luhmann has gone so far as to claim that there is no real "center" or "prince" in the world-system any more.[30] Although, institutional individualism is a "natural" product of the force of societal differentiation, it is also an institution with an ambivalent relation to sustainability. Yet, it would be misleading if one got compelled with the idea that institutional individualism was some kind of "antithesis" to sustainability. This is by no means the case. Sustainable development in a modern growth-oriented society will have a strong tendency to promote an increasingly embedded structure of institutional individualism since it is an evolutionary "strategy" very favorable for the problems of social differentiation. Frank Knight once said: "the familiar saying from Aristotle, that "man is a social animal," is both true and misleading."[31] The matrix of institutionalized individualism is imbued with this ambivalence, which reflects the "ontological openness" between personalities and social systems. For this reason, institutional individualism stand in a strained relationship with sustainability since a sustainable development must safeguard a minimum condition of social coherence, which naturally confronts the process of "individualization" and the imperative toward "innovation" embodied in the social process of institutional individualism.

Therefore, the quest of "sustainability", in particularly in regard to the local level, stands in an ambivalent position to the enhancement of social mobility and the relativization of social space inherent in the nature of modern society. This strain inherent in this process is speeded up by the new economy in ways that challenge the integration of society. Fragmentation appears as the cost-side of enhancing the overall "effectiveness" of the global world-system as a unit. It is the life-worlds of the world that pay the price by being faced with a tendency toward a destabilization of the social embeddedness of their demographic base. Ultimately, the destruction of the demographic base will eventually destroy the cognitive-cultural knowledge bases of that system, at least in the sense of an active lifeworld.

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[27] S. Ghoshal and C. Bartlett, *Changing the role of top management: From structure to process.* Harvard Business Review. January-February 1995, p. 86-96.

[28] Susan Helper, John Paul MacDuffie and Charles Sabel, "Pragmatic Collaborations: Advancing Knowledge While Controlling Opportunities." *Industry and Corporate Change.* Vol.9. 2000, pp. 443-487.

[29] Lynne Zucker, "Markets for Bureaucratic Authority and Control: Information Quality in Professions and Services." *Research in the Sociology of Organizations.* Vol.8. 1991, pp. 157-190.

[30] David Sciulli, *An Interview with Niklas Luhmann.* Theory, Culture & Society. London: SAGE. Vol 11. 1994, pp. 37-68.

[31] Frank H. Knight, "Human Nature and World Democracy." In Frank H. Knight, *Freedom and Reform: Essays in Economics and Social Philosophy.* Indianapolis, LibertyPress, 1982 (1947), p. 363.

In this way, a challenge to sustainability lies implicit in the forces of social development. Globalization imply that self-sufficient types of local autonomy might become difficult to maintain, since the involvement of local communities in an increased number of regional, national and global levels has an impact of the boundaries-maintenance regulations of the system. This development also increases certain options of the local community but only if the dissolving forces are not too strong. A sustainable society must naturally be able to constrain the fragmentary forces within acceptable boundaries. These boundaries involve issues of social capital, cultural coherence and other factors of the societal community. The idea that social systems can be endlessly flexible is an abortive notion; a totally open system is a dead system. Yet, in a modern complex society, the manifestations of system boundary regulation are not linear and simple. The question of "fragmentation" depends highly on the object and level of analysis. What is fragmentary (and a potential source of disintegration) from one point of view is a source of dynamic and growth from another. Therefore, the assessment of the "balance-sheet" of the sustainability within the whirlpool of modern development is by no means a simple exercise.

By highlighting the concept of societal sustainability, we clearly indicate that the long-term self-regulation of a society couldn't be adequately analyzed from the question of the economy alone. It is imperative to highlight that a successful societal development is the foundation for any long-term success in the economic realm. One sign of the significance of this lies in the fact that externalities and transaction costs loom large in any economic system. Another sign can be found in the issue of "bounded rationality." The economy does not institutionalize its own prerequisites. And by the same token, the economy is not the prime source of innovation since if was so, the economy would produce innovation as a cow produces milk, that is, by the very fact of its existence, which certainly is not the case. When Metcalfe suggests that the true strength of the market lies in its innovation promoting aspects, then the emphasis lies on "promoting" and not "constituting".[32] Only a sustainable societal development will establish these deep-structured patterns of value-orientations that provide the foundation of a community. Most of all, societal sustainability implies an "inner systemic process" which are not significant in the idea of "economics." Generally, economics is an outer systemic process, that is, it is primarily a mechanism operating between the system and its environment. The economy does not provide the foundation of society but exists as a specialized activity, which are societal capacities for utilitarian purposes. The economy depends, therefore, on those societal capacities, which is the outcome of the societal community as a system.

[32] J.S. Metcalfe, *On the Optimality of the Competitive Process: Kimura's Theorem and Market Dynamics*. ESRC Centre, School of Economic Studies, University of Manchester, July 2001.

Consequently, the economy cannot build a future, which is not already embodied in its seeds in the societal community,[33] so that the "miracles of the economy" always start with the secret advances of the societal community. Indeed, we might also say that a "miracle of the economy" which is not grounded in an adequate development of societal institutions will not remain a miracle for long. Some of the modern oil-states are a living testimony to this fact.[34] Generally, we will say that the "societal" is the prime facilitator of sustainability, so that economical sustainability has no meaning if the capacity for societal sustainability fails.

As development proceeds, society will eventually disturb its own equilibrium in order to progress. Accordingly, the conflict between "new" and "old," is more than simple "situational" occurrences; it lies so to speak "inherent" in the developmental process and is in a sense the system's dialogue with itself. To some extent the economy functions as a "wall-breaker" in society's quest for development, therefore from this point of view, some of the processes that challenge the balance and self-control of the societal community are not a threat to its long-term sustainability but rather an actualization of its developmental potentials. The problem from a theoretical point of view is to understand which part of the "disturbances" is system-affirmative and which is not.

Modern global development is characterized by a tremendous expansion in the level of complexity and the speed in which the matrix of production can appear on higher and higher differentiated levels of reality. Within this process lies a conflict, which goes to the core of the issue of sustainability. The main "problem" is that the social coherence of a community, in the classical sense of the term, is only possible when a social system is culturally grounded in a specific, historical location. A local community cannot be sustained if it becomes the object of an endless flexible distribution of the entities of its social structure. In this way, the cultural uniqueness of historical embeddedness stands in contrast to the civilizatoric quest for an "endless" flexible distribution of the factors of production.[35] Likewise, the key institutions of social life stand in contrast to the endless quest for "social reconstruction", which lies implicit in technological-

[33] If one looks carefully one will find that beneficial industrial development and the settling down of international cooperation only happen where "the seeds are ready". For example, it is probably unlikely that Nokia would have taken the decision of placing some of its cable manufacturing in Oulu, or that Oulu would have expanded into a high-tech region, if the city had *not* become a university town or if the university had *not* specialized in a technical direction and build a strong competence in electronics or if the university had *not* succeed in employing brilliant professors in the field or if a lot of other prerequisites for specialized competencies, had *not* been in place.

[34] Terry Lynn Karl, "The Perils of the Petro-State: Reflections on the Paradox of Plenty." *Journal of International Affairs.* 53, Fall 1997, pp. 31-48.

[35] Jens Kaalhauge Nielsen, *Civilization, learning processes and industrial development: An analysis of the general implications of the knowledge economy.* May 21, 2002.

economical activities. The concept of sustainability is caught in this dilemma. Schumpeter called this process for "creative destruction." Yet, the question is creative for whom?

The tendency of the new economy

One of the difficulties in analyzing the full implications of the fate of sustainability in the knowledge based economy lies in the fact that "the new economy" has only emerged in its initial stages. Therefore, it is difficult to say whether its current manifestations are temporary features or whether it represents a general outline. Imagine someone, who was supposed to grasp the full implications of the first industrial revolution by the early signs available around 1750. In some sense, we stand in the same situation, where it is easy to become compelled by initial phenomena, while failing to grasp the significance of the overall process.

Any new industrial revolution will tend to create a major gap between new structures and old structures in the beginning of the process. We are therefore in these years experiencing various gaps and fractures, which are natural for an initial process. One example of this is the notion of "a digital divide," which reflects the fact that various parts of the world stand in radical different positions of readiness to embark on the new process. In the case of regional development within the western world, we will suspect that various gaps only will "materialize" in comparatively moderate form, although the current development in some part of Scandinavia certainly indicates that also more drastic changes of the regional balance is possible. Yet, even a "moderate" developmental gap can still manifest substantial differences in the division between "traditional" and "new" areas.

One compelling question regarding the balance between center and periphery is whether the new information and communication technology will change the division of labor between these two poles, so that the periphery will get a better chance to compete on an equal level. A part of this answer comes down to the meaning of proximity and local space for the organizational mechanisms of production systems. The issue at stake is that few vital business interactions can be conducted in an effective and creative manner without the human touch. Studies of the dynamics of clusters show that proximity is a factor of greatest importance. Therefore personal interaction on a *particular* geographical space does matter in business life and therefore there are limits to how much vital functions can be satisfactory performed by outsourcing and long-distance communication. In this way, globalization process has by no means eliminated the significance of the proximity of space. Therefore, there is little reason to believe that the main structure of occupational roles, which has become a semi-monopoly of the cities, just will diffuse to the periphery as a simple factor of time.

Sustainability and regional dynamics: The Danish case

In the following section, we will use the Danish case in order to describe some of the mechanisms that characterize the transformation from a "traditional" industrial structure to one of a knowledge based society in order to through light on its consequences for regional development.

Denmark has been one of the countries in the world, where regional integration has been most successful. Not only is the difference in income distribution between the riches regions and the poorest regions very narrow by international standards but also the gap has stepwise become narrower since 1970. Yet, during the 1990s, when the new economy reached a certain "take off" point in Denmark, this pattern of convergence has approached a rocky road. Most of all, the change in the industrial mode in Denmark has resulted in the shift in the balance of the regional forces. During the 1970s and 1980s, the province – by which I mean the regions outside the two main cities of Copenhagen and Aarhus – did very well. These regions of the country, which in the old times were characterized by rural life, had in later years become strongly industrialized – and, indeed, more marked by manufactory industry than the main cities themselves. In the 1980s, these regions of Denmark – with the center in the Western part of Jutland – became the growth-centers of economic development. This industry was organized around a structure of comparatively small firms populated by handcraft-oriented actors, specializing in modes of production characterized by comparatively low technology or medium level technology. The main axis of specialization was food processing, textiles, furniture, construction and (comparatively) low-tech electronic machines. In the central part of Jutland, it was particularly low-tech textile and furniture factories, which dominated the scene.

Since this type of production was comparatively labour-intensive, routine-based and low in knowledge input, those regions that organized it were (by Danish standards) weak and underdeveloped in their educational structure, especially, when measured by a classical academic education. In particular, the highest echelon of academic education would be lacking. Likewise, this industrial setting was weak in the numbers of scientific research workers and scholars as a ratio of the population. Also, the major universities and higher learning institutions were, generally, situated outside these areas, so that there was no strong impetus for a tradition of interaction between business and higher research institutions. Yet, since this "traditional" industrial system for a while was highly successful, its comparatively low technological structure and a weak educational matrix went on unchallenged. The mode of production did not require a higher educational set-up, so lack of higher education was not a problem. Consequently, the young bright people who were seeking an education would leave the areas in order to study and not return, since there would be few or no jobs in the areas

that would suit their qualifications or their new professional interests. In this way, the system was perfectly suited to its own values and it received little impetus to change its own educational structure and its general technological level.

However, the emergence of the new economy, with its demand for knowledge-based industries, is drastically changing the rules of the game. The splendid low-tech production machine, which the non-metropolitan areas of Denmark had invented, has begun to show sign of stress and relative decline. Increasingly countries in East Europe and Asia are outstripping many Danish factories on the price-side, in particular, within the textile and furniture branches but also within other kinds of manufacturing industries. At the same time, the industries of the new economy appeared in strong concentration within the urbane centers, especially, in the Capital region, where the major educational and scientific infrastructure was situated and where a service industry of specialized professional knowledge long have been present. Since such an environment did not exist outside the big metropolitan centers, it was quite natural for the institutions of the new economy to emerge within a social setting, where the conditions were optimal. It is therefore no miracle that the new economy is "targeting" the main metropolitan centers.[36]

In the wake of the new development, the equilibrium of the regional forces in Denmark has shifted to the large metropolitan areas. At the current point, the growth centers of the new economy lies primarily in Copenhagen and Aarhus and, indeed, the real driving force is very much Copenhagen, which is characterized by very strong clusters of IT, the chemical industry and the quickly expanding biotech- and medical industry. It is also the place where 54 per cent of the student mass and the majority of scientific researchers are situated. In this new process, it becomes clear that the low level of educational structure, which in former years mirrored the industrial needs in the non-metropolitan areas, has turned into a major disadvance. For this reason, in later years, the former boom-areas have stagnated and have been unable to match the growth rate of the metropolitan cities. As a consequence, we have begun to experience a small, yet, signi-

[36] It is important to notice that we are emphasizing the existing of *vital structures,* which are using the cities as a "channel". Yet, this growth pattern is not in any naive sense an attribute of a metropole by definition. Not all cities in the world are prospering and growing in the wake of the new economy. Only cities that embody certain preconditions become growth engines in the new economy. A major precondition is that a successful metropole must have an "adequate" knowledge-based labour market. Yet, obviously, the preconditions are complicated and many. The same is true with universities. Many university regions become vehicles for growth in the new economy but not all university regions prosper. In all these cases, there is a structural point, which we might call the *"vital click",* that is, that point where vital processes become the dominant features in a structure. This point is of course of the highest theoretical interest.

ficant pattern of emigration from West toward East in Denmark. One can also register a drop in the workforce in many traditional areas.

This development has naturally special implications for rural areas, since these areas are often areas with a high ratio of "traditional" component of the industrial structure. So in rural areas, we will often find the weakest educational base and also a disproportional number of low-tech modes of production. Obviously, the approach of the new economy will naturally hit these areas particularly hard. Not surprisingly, during the 1990s out-immigration has increasingly become a problem for marginalized and socially strained areas of Denmark. This decline has been quite notable in certain regions at the Northwest and Northern part of Jutland, the Lolland-Falster area of Danmark, including the Island of Bornholm. Also, many small Danish Islands have experienced a critic point in their pattern of population decline. Generally, what characterizes such marginalized areas is a thinning out of people in the productive age group.

Indeed, tendency toward population decline, which now hunt many marginalized areas, would undoubtedly had hit all Danish rural districts by a much stronger force if it wasn't for one important phenomenon – the phenomenon of commuting. When we are studying Danish rural districts in particular those districts within (approximately) 40 minutes drive, we will discover that commuting is an extremely comprehensive phenomena. If we subtract the farmers and other people who lived by the land, within the rural districts close-to-urban areas, we will find that commuting in many cases involve about for 50-60 per cent of the workforce or even more. Most commuters pass the municipality borders and even the provincial borders on their way to work. So there is a sharp division between one's home base and one's work. In this way, the fate of one's home municipality and one's work municipality become two disjoined issues. As agriculture becomes rationalized and the traditional industries decline, the response in many rural districts has not been to build up a new Industrial structure but rather to solve the problem by utilizing the industrial structure in the nearby urbane environment. So in many Danish rural districts, there will be a decline of traditional industrial structure but not a similar attempt to build up new structure of business at the local level.

The new commuting culture has many implications of which I would like to highlight some of the negative. First, it often undermines attempt to build up a local industrial base. Second, it creates communities, which are empty or half-empty during the day and where many traditional types of small shops and services can not survive, because their customers disappear in the daytime and are shopping at big shopping malls elsewhere on their way home. Third, this pattern of employment links the rural districts very closely to the industrial development of the large cities, so it becomes difficult for communities to embark on a business development more genuinely tailored to the rural districts.

Obviously, the phenomenon of commuting complicates the question about sustainable development, when measured from the local community level. This trend conflicts with our idea that each local community should have its own industry in order to qualify as "sustainable." Indeed, when we think about sustainability, we certainly imply the idea of a community, which is self-regulating and which embraces the main function of a society. Generally, it must be assumed that the dislocation of key institutions of community life into other geographical territories must have some negative implication on the community's capacity to build-up vital structures and local solidarity. A community lacking its own industry is more than just a community without an industry, it is also a community, which lacks important channels for the build-up of social capital and which lacks important channels for its institutional learning-processes. In this way, an industry is more than an occupation or a source of income. It is a pillar in the build-up of the community's knowledge base and an axis to the world.

The new type of commuting-communities creates a completely different agenda and raises many questions about the meaning of sustainability. In the old type of community people were bound by common collective interest in the prosperity of their communities. If business went bad, it was a collective disaster, which involved everybody and by which everybody felt a responsibility. In the modern commuting communities, the context is very different. Eventually, commuting must be seen in a broader light. In one of its aspects, the globalization process opens up the local level and blurs the boundaries between local actors. One interpretive suggestion is that this results in a switch in the gravitation point of social forces from the local to the regional level. This should give credit to those scholars that claim that there has been an increase in the importance of regional systems.[37]

The question of commuting highlights an old classical question, which always have lied implicit in most discussions about sustainability and that is the question exactly by what prepositional standards the question of sustainability to become relevant? Although for reason of conceptual parsimony, we speak about the sustainability of social systems by a general token, we do not really believe that *any possible* social system can become "sustainable." For a social system to become sustainable there need to exist a certain critical mass of capacities, which might have a "scale" dimension but by no means is a matter of a sheer quantitative question. Also the question of commuting is addressing another issue, which is related to the idea that a community normally is seen as an entity that occupy a certain well-defined geographical space or "territory". So in this way, the question of societal development and the related idea of industrial growth were understood as a pattern of growth, which "physically" was represented by the appearance of "object" or "entities" located within this distinct geographical

[37] M. Storper and A. Scott, "The wealth of regions," *Futures*. Vol.27. no.5. 1995, pp. 505-526.

territory. Yet, modern development – of which commuting is just a symptom – seems to indicate that this idea of sustainable growth no longer is unchallenged. At least, there seems to exist the possibility of an increased *disjunction* between the development of the *social* community of a "rural district" and the *economical* development of the rural district itself. Hence, the people working in the rural district could come from communities far away (or be owned by people with interest far away) while the people living in that rural district could be working in the cities and regions far away.[38] So, in this case what exactly do we mean when we speak about a sustainable societal development of the rural district?

Cognitive capital as a cybernetic code to the international market

One of the main factors in the new economy is the increased focus on knowledge as the main factor for enterprises and regions to get a competitive edge. The general preconditions for this are the institutional build-up of an endogenous knowledge base and its general capacity for learning. Generally, however, a regional industry never utilizes all the cognitive resources embedded in the region's cultural heritage. Therefore, the key to a successful, sustainable development will be found in the region's capacity to activate its own historical knowledge base through innovative build-up. Successful economic development will depend on the regions' general capacity to "release" the power of its historical institutions. Consequently, the institutional build-up of a region is not only a question of building something "new"; it is to an important degree a question of utilizing the tradition already in place. In this regard, it is important not to misunderstand the use of the term "traditional industries" as it has been applied here. At least one must avoid the notion that tradition just is another noun for the concept of "obsoleteness." In this way, one should separate quite clearly between "tradition" as a general category, and "traditionalism" as a special attribute of its meaning.

As a categorical gestalt, a cultural tradition contains both the foundation for development and a capacity to prohibit such a development. Both possibilities are inherent in the "logic" of cultural systems. Yet, generally, innovative behavior does not happen because a community neglects its tradition but rather because it shows the capacity to utilize it.

It is said that we have approached a knowledge society. This is an assessment with many implications. Michael Porter has spoken about the critical role of intellectual capital in the strategic development of international business.[39] The extreme complexity of the modern world has multiplied the meaning of Driesch's

[38] In the current development in many rural districts, real industry will fade away and the districts will turn into long-distance suburbs.

[39] Michael Porter et al. *Global Competitiveness Report 2000.* Oxford University Press, 2000.

assessment: "There is no willing without knowing." Generally, the leading regions in the world will be those who are highest in control of the factor of knowledge and its creation.[40] Increasingly, the battle of market shares will come down to the criterion that he who controls the knowledge structure of the information flow of the market will eventually control the market. In management scholar Stephen Kobrin's assessment, the process of globalization is driven not by foreign trade and investment but by increasing technological scale and information flows.[41] We will notice in this regard that the fastest growing sectors are those sectors, which are highly knowledge based or high in information processing and data-mining. The real winners are those companies and those regions, which not only can establish information-control capacities but also are able to establish a long-term developmental path, where future advances already, are "programmed" in the community's knowledge base. Increasingly the real "capital" in the economy is not money but cybernetic control of cognitive capital[42] as it is invested in actors and technological products. As Schoenberger and Brodnig have highlighted: "The valuations and financing prowess of high-tech companies such as Cisco or AOL are primarily based on future revenue potentials embedded in their intellectual property."[43] It is by no means accidental that the issue of intellectual property has become one of the main international policy issues.[44] Naturally, a knowledge base should not be passive but active, that is, it should appear in the form of innovation. As Jeffrey Sachs has emphasized: "Global competition is being won only by those who can produce innovation."[45] Yet, innovation is in most cases, the result of cultural traditions moving slowly along a long historical path. Its accomplishments are not "innocent" but the gift of tradition.

Also, a community's idiosyncratically organized knowledge base (and its corresponding structure of cognitive capital) is in the final analysis, its ultimate

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[40] L. Garicano, "Hierarchies and the organization of knowledge in production." *Journal of Political Economy.* Vol.108. 2000, pp. 874-904.

[41] Stephen Kobrin, "The Architecture of Globalization: State Sovereignty in a Networked Global Economy." In J.H. Dunning (ed.) *Government, Globalization, and International Business.* New York: Oxford University Press, 1997, pp. 146-171.

[42] Cognitive capital is a community's accumulated stock of cognition, which represents the empirical structure of the cognitive order. Cognitive capital is from one point of view "the knowledge infrastructure" of the collective mind of a community, and, hence, cognitive capital represents the accumulated collective capacity "to learn," when this capacity is organized in a historical system. Cognitive capital is not knowledge; it is structuralized "rules" and pathways of learning.

[43] Viktor Mayer-Schoenberger and Gernot Brodnig, *Information Power: International Affairs in the Cyber Age.* Faculty Research Working Papers Series, John F. Kennedy School of Government, Harvard University, November 2001, p. 1.

[44] It has been estimated that American companies alone lost $ 9 billion in trade revenues because of copyright piracy.

[45] Jeffery Sachs, "A New Map of the World." *The Economist,* June 24-30, 2000.

competitive advances – because it is the only real asset, which core-structure cannot be copied and replicated by anyone else. Its knowledge base is too complex and too "unintelligible" to be imitated. Its intelligence is beyond comprehension since it works through the agents' cultural codification, where it appears as tacit and intuitive understanding. Not only can we with Hayek say that "we can profit from knowledge that we do not possess" but also it is true that we can profit from knowledge that we didn't quite know that we had. It is also in this connection, we shall understand Oakeshott's use of the term "practical knowledge", by which he attempts to conceptualize types of exclusive, culturally codified type of knowledge engrained in the specific lifeworld. Of which a crucial part of "the known" is embodied in actual practical pattern of acting, where the knowledge-operation is (intellectually) beyond the conscious level of the actor, yet, still something they "know-how-to-do."[46] Indeed, the faster knowledge is absorbed in the modern world, the greater will the control of knowledge depend on the basic sources of knowledge production and the core of this production is endogenous, "practical" knowledge.

In this way, the market-logic will tend to be controlled by various technological paradigms that again is controlled by those cultures which are able to enhanced the deepest structural levels of societal differentiation within the context of learning-responsive symbolic pattern. In the production of knowledge, we should place great attention to the effects of symbolic power as a vehicle for culture-bearing milieux. Knowledge is a cultural artifact and, hence, it is a cognitive-designative codification of symbols. Generally, innovative cognition will occur, when certain symbolically connected objects, significant for the cognitive process become the foci of a learning act. A highly innovative system can be defined as one where there is an adequate "stimulus-situation" in the symbolic communication between the cultural tradition and the cognitive system. For example, the significance of Weber's analysis of the protestant ethics was to point to a particular "stimulus-situation" that could explain the differentiation pattern observed in the productivity of various cultural mode of organization. What is needed to understand innovation; is a meta-theory about how social energy is symbolically distributed within development systems of adaptive cognitive self-stabilization. Each level of developmental complexity must correspond to a new equilibrium of cognitive self-stabilization, which must correspond to a shift in designative code of societal symbolization. Innovative behavior must be correlated with the symbolic metabolism of culturally designative code-shifts. For example, if Athens would have had the same symbolic metabolism of Sparta, it is unlikely that the cognitive innovation of classical philosophy (in the post-Pythagorian form) ever would have materialized in history. Yet, without the ancient revolutions of Parmenides and Pythagoras, the

[46] Michael Oakeshott, *Rationalism in Politics and other Essays.* London: Methuen, 1962, p. 11.

new equilibrium of cognitive self-stabilization (featured in the Socrates-Plato-Aristotle equation) would not have accumulated the necessary designate power of cognitive symbolization to materialize. Therefore, when we ask why certain nation-states, regions, industrial districts or enterprises are more "innovative" than other, we should look for the way by which various processes of cognition (and technological paradigms) are structured as connected objects within path-dependent systems of symbolic expressivism and symbolic constitutionalism. For example, social capital (as a marker of "social energy") is more than the build up of civil institutions; it is a "response" to differentiation in the signal-value in the homeostasis of symbolic gestalts. As Fukuyama has attempted to show various cultural gestalts reveal different levels of competitive success.[47]

The criteria for a successful, sustainable community will be one who has built-up a particular sensitive cognitive base within its institutional tradition that is able to react "intelligently" on each state of the world market's industrial development.[48] Such a cognitive base is reflected in a community's educational system but involves naturally all the complexity of the community's combined socialization processes. Industrial excellence is therefore something that is built up through a long internal process before it appears as a specific "operational institution" or through an act of "innovation." Most of all, it is path-dependent, that is, it cannot jump over its own history.

The future of the regional actors will depend on their capacity to detect, analyze and act upon their own unique knowledge base. Their capacity to reflect on one's own knowledge is conditioned by their *cognitive code*, which is a concept expressing the general set of intellectual prerequisites by which a community is endowed with a capacity to learn.[49] As the consequence of the new learning economy,[50] regions must become "learning regions".

Sustainable societal development in rural districts

Rural regions are faced with a troublesome period in the new economy, because they are least prepared to meet the new challenge and since it is the "traditional"

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[47] Francis Fukuyama, *Trust: The Social Virtues and the Creation of Prosperity.* Penguin Books, 1996.

[48] Of course, no community can literary "build up" such a capacity in some kind of direct rational sense. On the contrary, such a capacity is rather a cultural pattern, which is the heritage of a community and which they can modify and "direct" to some extent. Naturally, the cultural system as a historical entity is the outcome of interaction, yet, since a cultural tradition often contains thousands of years of accumulated interaction, the impact of the present days interaction within its limited time sequence can only add so much.

[49] The cognitive code is not in and by itself any knowledge but "deep structures" in Chomsky's sense, which function as the historical rules for cognitive learning.

[50] B.-Å. Lundvall and B. Johnson, "The learning economy." *Journal of Industrial Studies.* Vol.1. no.2. pp. 23-42.

industry in the rural regions, which to a large degree will become the main "casualties" in the new development. Indeed, in many districts in the periphery, the numbers of jobs in the classical occupations (agriculture, fishery and low-tech types of manufactory industries) have been steadily declining. The result is the opening of a gulf between the declining "traditional" industry in the periphery and the growth oriented new economy in the urbane centers.[51]

In the old days, rural and marginalized regions were participators in a well-defined division of labor. As a main rule, they supplied various forms of natural products or had with various exceptions specialized in comparatively labor-intensive and low R&D mode of productions. In the case of Denmark, these industries were generally so successful, so they extended beyond the national market and were based on export to a large extent. For a while the comparative insufficiencies of the global market and the lack of real East-European competition in the era of the cold war, provided these actors with a favorable environment, where foreign competition could be kept at bay. However, the stepwise liberation of the international market and the inclusion of East Europe as a real player in market behavior changed the international market situation drastically for natural resource products and low-technological products. During the 1990s competition increased, while at the same time the ICT revolution broke through the industrial matrix for full power. All this undermined the established mode of production of the periphery regions in Northern Europe and placed these regions in an increasingly problematic position.

The structural vulnerability of the periphery in the current transformation process is based on the classical indicators of weakness. The most crucial lack is sufficient resources of qualified labor at the highest level of education. In Denmark, the newspapers have begun to address the issue of the educational divide between the main cities and the province, through headings such as "the brain lies in the city."[52] At least, within the highest echelon of academic education, one can find a significant regional imbalance. The ICT consultant sector is an indicator of these forces, since the ICT consultant sector tends to cluster around available pool of highly educated and qualified labour. In Denmark, we will find that 66 per cent of the ICT consultant industry was located in the Greater Copenhagen area.[53] If we take Copenhagen and Aarhus together, we reach 80 per cent of the sector.

Although one can find some hopeful strategic answers to those regional areas in the periphery, which contain major city components, it is much more difficult

[51] Agriculture, in Denmark, we might remark is doing quite well, it is the other industries in the rural districts, which are in an increasing situation of strain. However, the other industry is today the main industry in almost all rural districts.

[52] Weekendavisen, 9-15 August 2002, p. 3.

[53] Lars Winther, *The Spatial Structure of the New Economy in the Nordic Countries.* Nordregio 2001.

to find some optimistic answers to the future development of the classical rural areas on the local level. In the current juncture of the process, it is very difficult to find any "magic" answer to the industrial future of the rural areas. In later years, industrial clusters have been seen as an important tool in the promotion of dynamic development. However, industrial clusters as a strategic might be an answer for some regional areas but are for obvious reasons not a general answer to rural areas on the local level. If a rural area becomes the host of an industrial cluster, it will be the exception and not the rule. Some rural districts find a solution in commuting but commuting cannot become a realistic option for many rural districts and commuting can be seen as a way of circumscribing the question of local industrial development, rather than to find a way to solve the problem.

One joker in this equation is the long-term consequences of the ICT revolution as a gigantic reorganizer of industrial structure and the meaning of social space. Indeed, the exact way in which many rural regions will link up with the ICT revolution will become very decisive for their future path. Originally in the IT revolution lay the implicit "promise" that communities, companies and individuals at the geographical periphery no longer would be relegated to the sidelines. However, the degree in which IT will change "the parameters of distance" and bring rural communities closer to the center of event is surrounded with high uncertainty. Another uncertain factor is the long-term implications of the biotechnological revolution on the industrial framework of traditional agriculture. It is clear that some kind of marriage between biotechnology and agriculture lies in the cards but the exact meaning for future modes of production are speculative at best. In this way, there lies many captivating options for rural districts in the future but very little on which one can place a hardcore objective prognosis.

Clearly, it appears very unlikely that the rural districts in their future development will overcome the center-periphery divide and reached a state, where it will be able to compete with the urbane centers on equal terms (within those standards characterizing the centers). At least, we will expect a major proportion of the future industry in the rural areas will consist of secondarily functional tasks delegated from the centers. As an alternative, one often mentions that rural districts should embark on their own different road, which indeed might seem both necessary and plausible. Yet, how large is the scope of different, non-mainstream pathways left open by the logic of the new economy? From a realistic point of view there will be strong limits to how far the rural districts can deviate from the main forces of industrial development without suffering economic disadvances.

Whatever the future will bring, the most important path for rural districts must begin around its own distinct, "idiosyncratic" knowledge base. Certainly, for a region to just repeat what everyone else has done is not the prescript for compe-

titive advantages. As Peter Maskell has highlighted: "Little progress would be made in a world of clones."[54] Yet, to institutionalize new patterns of learning around the established knowledge base and to transform them into industrial enterprises is a process that takes time.

One important problem for the future of rural regions is the question of *timing*. The problem is that the most feasible solutions for rural regions will take a comparatively long time to develop, while the threat of demographic decline and out-immigration is a process with a much shorter time-scenario. In other words, we cannot expect that the demographic balance of rural districts is waiting on the right industrial solution to slowly materialize step by step. Especially, if rural districts shall attract business in tomorrow environment, they need to improve their educational capacities drastically. Yet, if this is a realistic option at all, it is at least an option that takes time. For this reason timing is the real dilemma in the process.

The pattern of out-immigration in Scandinavia countries is today the most visible sign of the problems ahead. Various Scandinavian countries appear to have different political attitudes to the trend toward out-immigration. In Finland, which still has one of the highest ratios of rural areas in Europe, it is almost official policy to accept the strengthening of the urbane center on the cost of the rural area. In Iceland, many decision-makers appear to accept the fact that it is impossible to keep people in the rural areas.[55] In Norway, Sweden and Denmark, the attitude is different. In these three countries, we find an obligation toward a policy that aims at keeping the rural areas populated. Yet, one thing is to have a policy of an equal development of all regions of the nation; another is to carry it out in a way that is meaningful and feasible. To keep the Northern regions of Norway and Sweden populated is quite expensive. Yet, even more troublesome is the fact that it is very difficult in these areas to promote an industrial structure, which is truly sustainable and embedded in an endogenous development. This is, of course, the same problem facing the Danish policy in Greenland, where the whole system is heavily depending on Danish transfer-money and professionals and where the system would collapse if the artificial political instruments were removed. In this way, the question how to keep highly marginalized rural areas alive provides us with a reinforced case of all the dilemmas and problems associated with the quest for a sustainable societal development. With the possible exception of Alaska, it will be difficult and perhaps impossible to find any region in the higher North within the whole globe that is sustainable in a true and fullest

[54] Peter Maskell, "Future Challenges and Institutional Preconditions for Regional Development Policy Posed by Economic Globalization." In Ilari Karppi (ed.) *Future Challenges and Institutional Preconditions for Regional Development Policy: Four Scenario Reports.* Nordregio Report 2000:1. Stockholm, 2000, p. 37.

[55] Jon P. Knudsen, "Águst Einarsson: We could have had between 3 to 30 million inhabitants here." *Journal of Nordregio.* No.4. December. Vol.1. 2001, pp. 13-14.

sense. Although one cannot completely exclude the possibility of economic sustainability for some of these communities since these regions contain some of the largest gas and oil resources in the world.[56] Still the question of societal development in the northern regions is, as a general rule, promoted by political instruments and transfers and such a situation is naturally very far from anything which one ought to call "sustainable."

One main question involves the criteria of regional developmental policy. In particular, how will the role of government ("the state") influence the process of rural development? In the last twenty years, there has been an increased understanding of the importance of a genuine endogenous and sustainable development of regional areas. At the same time there has been a shift in the way government conduct regional development policy. According to the new policy, government shall support endogenous development not by massive state-intervention but by indirect means of framework building and "midwife" activities. Yet, the main question how government helps endogenous development without suffocating it in transfers and artificial solutions remains a key issue for continued discussion. Obviously, government will play an important role in regional development, since there are social functions that cannot realistically be sustained by each regional and local level. Yet, exactly by what principle government should interact on the regional and local level remains an extremely complex and open-ended issue, which we cannot attempt to approach in this discussion.

The rural districts are today faced with a fundamental challenge as the forces of the new economy proceed along. It would be nice to give practitioner a simple bouquet of answers of what to do. However, beside certain rules of the thumb there exist no simple strategy, which are equally relevant for all communities within rural districts today. Generally, political actors in rural districts must increasingly think within a regional perspective and hence, pragmatically, become integrated in the urban development within the nearest center. Since, commuting increasingly will link the rural economy to the city, the local decision-maker might as well make a virtue of necessity as least from the point of view of bread-and-butter politics. The visionary local planner, however, will simultaneously try to build up local, embedded industrial capacity in the hope that the future somehow contains some better deals for local sustainable development. In all this, we should not forget that the better aspect regarding gloomy future predictions is that the future always acts in contrast to most predictions.

[56] Naturally, oil and natural gas are non-renewable resources, so from a very long-term perspective there is nothing really "sustainable" about an economic foundation, which rest on such resources. The question is, however, what time-perspective one applies and in the "real " world of decision-making, the time-perspective for economic solutions is generally limited and within such a limited spectrum of time, the statement is "true".