The theory of the firm and the markets for strategic acquisitions*

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Abstract. Five problems are addressed: (1) the role of competent actors in the venture capital and exit markets supporting the industrialization of winning technologies in small innovative firms, (2) the competence of the large firm to integrate large-scale operational efficiency with small-scale innovative capability through distributed development work and integrated production and (3) the importance of viable markets for strategic acquisitions, both in making this possible and in allowing a flexible choice for the small firm between growing aggressively on its own through own acquisitions, or being acquired strategically itself. We (4) find that the less developed markets in continental Europe may be a disadvantage compared to the US in ushering in a future New Economy. We finally (5) discuss what becomes of the Coasian theory of the firm when production is constantly outsourced in, or insourced from the market as the relative efficiency of coordination through management and over the market changes. One logical consequence is that the costs of business mistakes will have to be included in transaction costs.

Keywords: competence bloc – experimentally organized economy – heterogeneity – Marshallian industrial district receiver competence – strategic acquisitions

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1 The problems

The last couple of decades have seen an increase in the fragmentation over markets of firms as centrally coordinated hierarchies (Eliasson, 1986b, 1996b, 2001b,a). Products have been modularized and the production of components or entire systems outsourced in the market, only to be insourced again at some later stage. Coase (1937) outlined the principles behind such organizational change when explaining the rationale for the existence of the firm as a hierarchy in those instances in which management has a transaction cost advantage over production coordination. Holmstroem and Tirole (1989) extend that notion of a firm to a "contract between a multitude of parties" imposed over the market to "minimize transaction costs between specialized factors of production". Since this is an authoritative statement in the Handbook of Industrial Organization on the theory of the firm, we begin there. Empirically integrated development work and production distributed over markets are becoming an increasingly important productivity factor in the emerging industrial technology (Eliasson, 1996b; Jovanovic and Rosseau, 2002; Lerner and Merges, 1997) moved, notably, by modern computer and communications technology. Firms are reorganizing through acquisitions and divestments to gain competitive advantage. Both the notion of a firm and the structure of markets for control, hence, are experiencing radical change. To integrate the organizational problem of firms that have to rely on the external market for innovations with the theory of the firm, the notion of the reorganization of production structures over markets has to be endogenized. This means not only accepting complexity, ignorance and business failure, but also making *business mistakes part of transaction costs*. This disrupts the exogenous equilibrium properties of the neoclassical model. Transaction costs can no longer be minimized independently of the production organization. Further, the story to follow argues that it is empirically unacceptable to structure the theory of the firm such that this is possible.

We use competence bloc theory (Eliasson and Eliasson, 1996, 2002a) to (1) model the firm as an endogenously changing organization distributed over markets, the extended firm (Eliasson, 1996b), and (2) to demonstrate that an endogenous hierarchy makes it possible simultaneously to achieve both the narrow focus needed for operations efficiency and the broad exposure to a maximum of varied competence needed to be dynamically[1] efficient in the Austrian-Schumpeterian environment of the Experimentally Organized Economy (EOE, Eliasson, 1987, 1992). More precisely, we address the existence of a market for strategic acquisitions as a source of systemic productivity gains ("economies of scale") and a mover of industrial dynamics. The problem addressed is elucidated by the fact that the large firm, normally oriented towards large-scale operational efficiency (Eliasson, 1976, 1984, 1996a, 2001a; Acs and Audretsch, 1988), has problems with its innovative capabilities. Small firms, on the other hand, are less formally organized and more flexible and, therefore, thought to be more capable of innovative achievement. The small firms, oriented towards innovative performance and pursuing radically new innovations,

[1] The reader should observe already here that this notion of dynamics takes us far beyond the neoclassical notion of dynamics, that often uses the attribute as soon as a time variable figures in the equations

by contrast, suffer from the ignorance of the financial community when it comes to understanding what the firm is doing and the high financial risks for the innovators/ entrepreneurs associated with taking a winning innovation on to industrial scale production. The *industrial competence of the actors* in the financial markets intermediating trade in intangible knowledge assets, therefore, is a key concern. Here we draw directly on the property rights analysis explored in the companion paper (Eliasson and Wihlborg, 2003, see also this volume).

Venture capitalists, as we define them (Eliasson and Eliasson, 1996; Eliasson, 2003), are characterized by their competence and capacity to understand radically new business ideas and provide reasonably priced financing. But the little firm doing it on its own faces the additional problem of being too slow in reaching industrial scale, and, therefore, risks being overtaken or imitated by a larger firm with ample financial resources. The second part of the same problem is the increasing inability of large business firms to do it all and to efficiently incorporate or internalize all the needed competences within one hierarchy. The large firms normally have the financial capacity to buy and possibly also the competence to discover and to access new technology at fairly advanced stages of development and close to their core business, but have problems with their indigenous capacity to create the same technology. In addition, the large firm normally has great difficulties introducing radically new technology in its operations-oriented organization because of the lack of *receiver competence* and a consequent skeptical attitude among the staff to the introduction of novel and organizationally disrupting ideas (Eliasson, 1976, 1984, 1990a; Eliasson and Granstrand, 1985). In the Holmstroem (1993) model, this is explained in terms of a bureaucratization that arises because of the higher transaction costs associated with "mixing hard to measure activities (innovations) with easy to measure activities (routine)". For the large firm, there is, however, the additional problem of competence supply, notably of innovative, technological variety that has become critical for survival in the new economy. Since the single firm normally lacks the capacity of internally supplying all the needed variety of innovative services, the solution has increasingly become to acquire complementary services externally. For this to be possible, the advanced manufacturing firm has to access the broad and deep markets of subcontractors. The more advanced and the more dependent on R&D, the more important it is that technological supplies can be outsourced. Outsourcing of technological development is a difficult part of advanced production that has become necessary and has been seriously learned only in the last decade or so as new computing and communication technologies have made the integration of globally distributed production feasible (Eliasson, 2001a, 2002b). We look especially at the existence and the role of viable markets for strategic acquisitions[2], and how the incentives needed to support such markets depend on competition for their innovative services from a varied set of large corporate customers (Eliasson, 1986b).

This paper, hence, focuses on three problems:

[2] The implicit assumption of Arrow (1962) that technological services can be outsourced to technical universities and government-run laboratories is based on the assumptions of the static general equilibrium model with zero transaction costs, and is simply a misconception in this context, even though it has been extensively used in the theoretical innovation literature. See further below.

1. The venture capital competence needed to discover and to commercialize radically new technology in, and support expansion of, the small firms,
2. the competence of the large firm to integrate large-scale operational efficiency with small-scale innovative capacity through distributed development work and production integrated over the market, and
3. the conditions for the existence of viable markets for strategic acquisitions that offer profitable choices for the small innovative firms to pursue their own growth plans and/or (second best) to aim at being strategically acquired. This choice will be seen as a determining incentive for a rich supply of innovative firms.

The critical role of appropriately designed contractual rights to knowledge to establish *the tradability in intellectual capital* needed to support knowledge creation and allocation over markets for strategic acquisitions has already been addressed in the companion paper (Eliasson and Wihlborg, 2003).

2 Background theory

The classical representation of a firm is that of a monolithic hierarchy controlled from the top. Before Coase (1937), and even decades after the publication of his article, most economists bothered neither about the firm nor about the organization of the economy. They were concerned with analyzing industries in which live firms disappeared in aggregates.

Marshall (1890, 1919) wanted to change this situation and is credited by Schumpeter (1954) with having been the first to bring business economics into economic theory. His "representative firm" was an attempt to deal with the aggregation problem, although his "industrial district" analysis is more innovative and to the point in this context. This analysis featured a network of subcontractors – an organization of production within which systemic productivity gains could be captured – that allowed him to make increasing returns compatible with the then-dominant Walrasian model. Marshall's industrial district included already in 1890 a micro-based formulation of what later (in the 1980s) came to be called "new (macro) growth theory".

Coase (1937) recognized that the outer limits of the firm were determined by the relative costs (transaction costs) to coordinate the business through a hierarchy and through the market. The "hierarchy" or firm became endogenized and changed in response to market forces, drawing significant transaction costs. Arrow (1965) emphasized the role of the organization in bearing risks where the market failed. But *organization is a more general instrument to cope with competitive change* . This makes it natural to extend the Coasian (1937) model to handle also the dynamics of the new, loosely structured extended firms (Eliasson, 1996a,b, 1998b) that constantly reconfigure their internal structure and trade in parts over the M&A market. In neoclassical R&D based innovation functions, the roles of the innovator, the entrepreneur and the venture capitalist are collapsed into one. Technology becomes a linear driver of growth. Also Joseph Schumpeter (1942) superior scientifically-based firm that would eventually dominate its market is based on a linear technology growth relationship. The organization of innovative activity and of *"The Markets*

for Innovation, Ownership and Control" (Day et al., 1993) may, however, *matter not only for innovative output* but also for the link between innovative output and economic growth. Once that possibility has been recognized, the intersection between hierarchies and markets (the organization of the firm) becomes endogenized and tradability in technology assets becomes a determining factor. Control rights to assets is the signum of a firm as a hierarchy and the optimal assignment of assets is one way to understand the boundaries of the firm (Hart and Moore, 1990). But a firm is more than a contractual arrangement to allocate ownership, control and responsibilities of the parties involved (Holmstroem and Tirole, 1989). The financial structure is not independent of the underlying production organization; for instance, the choice between outsourcing and internalizing through vertical integration also depends on the control of production desired (Lewis and Sappington, 1991)[3].

The competence embodied in the hierarchy can be improved by reassigning control rights to the actors with maximum competence to run the business (Aghion and Tirole, 1994), who might in turn change the production organization. A different authority (hierarchy) can thus be superimposed on, and exceed the limits of, the Coasian firm. The stronger the property rights, the more tradable technology assets and the stronger the influence on production organization (Eliasson and Wihlborg, 2003).This reassignment has a precise meaning in the knowledge-based information economy (Eliasson, 1990b), featuring large information and communications costs and a virtually unlimited set of business opportunities. Firms, *defined as competent teams* (Eliasson, 1990a), are normally grossly ignorant about circumstances relevant to their business and long-run survival, not least about what competitors are up to. They, therefore, set up business experiments to the best of their knowledge, which sometimes succeed, but often fail. Business mistakes, therefore, become a normal cost for economic development and part of the transaction costs incurred when doing business. Hence the term the Experimentally Organized Economy (EOE). The central firm (management) problem in the EOE now becomes to minimize the economic costs of two types of errors, namely (Table 2A) to keep business mistakes on the books for too long and to lose the winners. We identify the scope of the organization called a firm within which management can do this. The key problem is to avoid losing the winners, which for a competent management is perhaps the largest item in transaction costs. Part of the competence involved in achieving this is the art of delimiting the scope of the firm (the span of management, Simon, 1957)[4]. Minimizing transaction costs cannot be done independently of the exercising of this art. As we will see, this is no trivial problem in the theory of the firm. *Competence bloc theory* also deals with this problem of dynamic efficiency in the EOE. In competence bloc theory, the creation and selection of projects can be distributed over competent actors in the market, or be internalized within the firm.

[3] Here Desai et al. (2002) observe that US multinationals have, over the last 20 years or so, gone from loosely structured alliances to 100 percent ownership control. They explain that by a desire to exercise more control in coordinating production and in technology transfer, a development also induced by a liberalization of ownership restrictions in host countries and by trouble with new US tax reforms when it came to the free use of rational internal transfer prices across borders.

[4] The loss of winners is no problem in the WAD model, since it cannot occur there by assumption (Eliasson, 1992)

von Hayek (1937) formulated this as a parallel to Adam Smith's dictum of decentralized production, when he discussed the "division of knowledge". Knowledge dominates all other physical forms of capital in determining the productivities of other factors of production. But knowledge capital is not well defined and cannot be understood and managed analytically under the assumption of full information economics . Knowledge is largely tacit and incommunicable, and can only be allocated by knowledge (cf. Demsetz 1969 and Pelikan 1986,1988 on economic selforganization). Markets in tacit knowledge are often characterized by infinite regresses and the non-existence of an external equilibrium. As a consequence, dynamic efficiency in the sense of minimizing the economic consequences of the two types of errors in Table 2A can only be achieved by exposing each project to a maximum competent evaluation. That, in turn, can only be achieved in low transaction costs markets with well developed property (control) rights that support trade in intellectual assets (see Eliasson and Wihlborg, 2003). Attempts to centralize the decision will make the decision/selection more narrow and raise the risk of losing winners. We, therefore, introduce competence bloc theory as an organizing device for the distributed (over the market) creation, identification and selection of projects in the experimentally organized economy (EOE). Competence bloc theory will allow us to identify the markets for competence that are critical for the project selection that is the key to the efficient solution of all three empirical problems of this paper. For this to be possible, however, tradability in the competence/control rights or intellectual assets has to be established in the non-equilibrium setting of the EOE.

3 The commercialization of winners in the experimentally organized economy – the first problem

The theory of the EOE features growth through experimental project creation and selection. Competence bloc theory explains the nature of that selection, which, in turn, allows us to understand the roles of a venture capital market with industrially competent actors and the market for strategic acquisitions in reconfiguring firms into new business combines. These two markets exist in, and integrate, the activities of actors in the competence bloc.

3.1 The experimentally organized economy

The notion of a knowledge-based information economy (Eliasson, 1990b) is used to establish the basic assumption of a business opportunities set of such complexity that practically all actors become grossly ignorant even of (for them) very relevant circumstances. This means that business decisions will have to be seen as more or less well prepared (business) experiments that often fail. In this experimentally organized economy (EOE), growth occurs through competitive project creation and selection.

The EOE offers an alternative to the Walras-Arrow-Debreu (WAD) model (Eliasson, 1992), the main difference being the assumed dimensions of the (business) opportunities space, or state space, and the appearance of significant information and communications (transaction) costs in the form of business mistakes. The

latter removes the property of an exogeneous equilibrium of the WAD model. The WAD model assumes the state space to be extremely small and sufficiently transparent for all options to be identified. In the EOE the state space is extremely large and non-transparent. The theory of the EOE thus embodies the experimental nature of dynamic markets and allows ignorance and business mistakes natural roles to play. It has its roots in the Austrian economics of Menger (1872) and in Schumpeter (1911), before Schumpeter turned "linear" in 1942. The EOE features economic growth through experimental creation and selection of innovative projects. A policymaker in the EOE would constantly face the problem of efficient exit, i.e. of forcing badly managed incumbents or new entrants to exit without exiting winners. This is the dynamic efficiency problem of the theory, demanding great and varied competence on the part of actors participating in the selection process, *including* the policy maker if "it" feels a need to get involved (Eliasson, 2000). Salter curve analysis (Salter, 1960) then allows the *Schumpeterian creative destruction process* of Table 1 to be derived, and relates it to macroeconomic growth (see Eliasson, 1996a, Section II.7).

Table 1. The four mechanisms of Schumpeterian creative destruction and economic growth

1	Innovative entry
	enforces (through competition)
2	Reorganization
3	Rationalization
	or
4	Exit (shut down)

Source: "Företagens, institutionernas och marknadernas roll i Sverige", Appendix 6 in A. Lindbeck (ed.), Nya villkor för ekonomi och politik (SOU 1993:16) and Eliasson (1996a, p.45).

The performance characteristics of an agent can be ranked in each market. The Salter curves of Fig. 1 exhibit such rankings of rates of return or temporary knowledge rents[5] for two years in Swedish industry. Superior firms to the left can outbid lower down firms in hiring people, buying components, lowering prices or acquiring firms. But the challenged firms know this and have to act to improve their situation, thus challenging the (temporarily) superior firm. All incumbents are challenged by new entrants, and challenged firms that cannot cope with the situation are forced down the curve, eventually to exit at the low right hand corner. Competition is endogenous, forcing organizational innovative behavior as represented

[5] The rates of return shown in Fig. 1 minus an appropriate interest rate can be said to measure temporary knowledge rents and the incidence of random factors or "luck". Expected such returns to capital over the interest rate drive firm investments in the MOSES micro-to-macro model to be referred to in the next footnote. The rents so defined have been estimated for the real firms in the so called planning survey of the Federation of Swedish Industries that make up the population of MOSES firms since the mid 1970s (MOSES Data Base). Those rents exhibit considerable volatility over the firm population and time (see Albrecht et al., 1992).

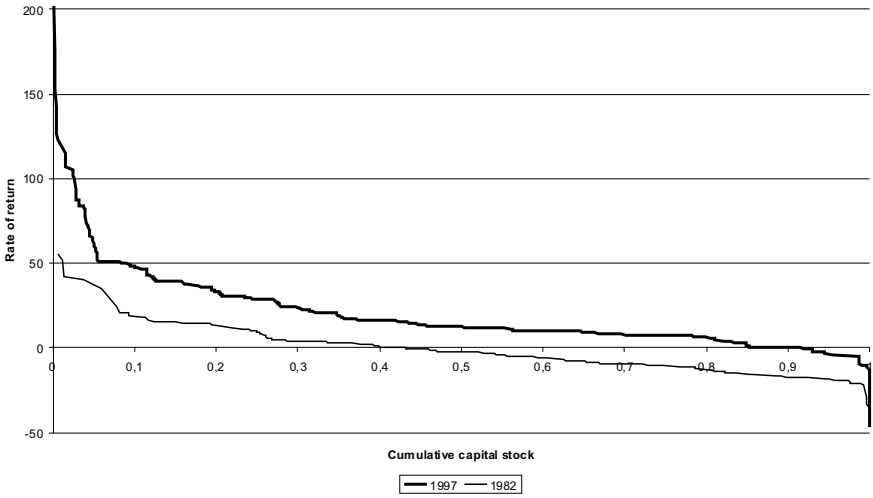

Fig. 1. Rates of return (per cent), 1982 and 1997
Note: Swedish manufacturing industry
Source: MOSES database.

by the four categories of Table 1. Only if society is "efficiently" organized and equipped with the right institutions and incentives will this dynamically competitive process of experimental selection lead to macroeconomic growth through the outward shifting of the Salter curves. But endogenous competition could also lead to contraction and exit[6]. The problem for the policy maker is to organize institutions such that winners are helped to move on and losers are forced to release resources, notably competent people, for the growing firms. By increasing factor supply factor prices are held down. This dynamic turns exiting losers into growth contributors. *Dynamic efficiency* in the EOE can thus be characterized by the capacity of the economic system to "minimize" the economic consequences of two types of errors in the Schumpeterian creative destruction process, shown in Table 1, not to keep losers for too long and (most importantly) not to lose the winners (see Table 2). Competence bloc theory organizes tacit knowledge distributed over markets and hierarchies to achieve that outcome.

Table 2. The dominant selection problem

Error Type I: Losers kept too long
Error Type II: Winners rejected

Source: Eliasson and Eliasson (1996).

[6] This Schumpeterian creative destruction process endogenizes economic growth in the Swedish micro-to-macro model MOSES (Ballot and Taymaz, 1998; Eliasson, 1991, 1996a, 2000). Johansson (2001) has econometrically tested for the characteristics of firms and their environment that make firms expand rather than contract under competitive pressure, i.e. for the circumstances that make the Schumpeterian creative destruction process of Table 1 lead to industry growth rather than contraction. Also see Eliasson (2000) and Eliasson et al. (2002, 2004)

Table 3. Actors in the competence bloc

1	Competent and active *customers*
2	*Innovators* who integrate technologies in new ways
3	*Entrepreneurs* who identify profitable innovations
4	*Competent venture capitalists* who recognize and finance the entrepreneurs
5	*Exit markets* that facilitate ownership change
6	*Industrialists* who take successful innovations to industrial scale production

Source: Eliasson and Eliasson (1996). The Biotechnological Competence Bloc, Revue d'Economie Industrielle, $78 - 4^0$, Trimestre.

3.2 Competence bloc theory

The competence bloc (Eliasson and Eliasson, 1996, 2002a) lists the minimum number of actors with competence needed to minimize the economic consequences of the two kinds of business errors. It is a theoretical design that allows an organization of decentralized tacit knowledge without specifying the content of knowledge, except by *function and carrier*. The solution is to organize diverse and distributed competences in the economy such that each project is exposed to a maximum of competent and varied evaluation. The competent *customer* (item 1; Table 3) defines the maximum degree of "sophistication" of the product for which the most advanced customers are willing to pay. *Without competent customers there will be no markets for sophisticated products*. The competence bloc incorporates the Burenstam-Linder (1961) idea that advanced customers constitute a comparative advantage for the rich industrial countries. During the development of advanced products, such as aircraft, technologically knowledgeable customers often contribute directly to product technology (Eliasson, 1996b). The normal situation, however, is that the customer chooses between different product offers. Heterogeneity in the supply of innovative new products and the supply of competent customers with varying tastes, therefore, set limits to technological advance. The *innovator* (item 2) is defined as the actor who combines new and old technologies into new composite technologies, to be selected by economic (profitability) criteria by the *entrepreneurs* (item 3)[7]. The entrepreneur, in turn, normally needs external financing to move expected winners on, but that financing has to be associated with a competence on the part of the financial contributor to understand the entrepreneurial selection. Otherwise (Eliasson and Eliasson, 1996), the conditions will be so tough as to leave little or nothing for the innovator and the entrepreneur. The *competent venture capitalist* (item 4) selects the winning entrepreneurs. The venture capitalist, however, needs large and deep *exit markets* to unload his stake with a large profit at the, for him, appropriate time. If a real winner is moving through the competence bloc, the next step is for a competent industrialist to take over and move the project on to industrial scale production and distribution. The industrialist now acts as a customer in the exit market, or rather in the intersection of the venture capital and exit mar-

[7] For theoretical reasons we want to give the innovator a technological definition. The innovation is selected and transformed into a business proposition by the entrepreneur. This is von Mises (1949) rather than Schumpeter , who does not distinguish clearly between the two concepts.

kets, that we call the market for *strategic acquisitions*. By analogy with the earlier customer analysis, without a broad range of sophisticated industrialists/customers, an active market for strategic acquisitions would not exist, and there would be no real incentives for sophisticated entrepreneurial firms to enter the *market*. Apparently, all later stages (in the competence bloc) are important for incentives to be effective at the earlier stages. If the competence bloc is not *vertically complete*, the risks are large for the earlier stage innovators and entrepreneurs[8]. But vertical completeness is not sufficient. One actor of each does not guarantee a varied and competent project evaluation. Many of each with very different competences are needed. Only when *vertical completeness* and *horizontal variety* are in place can *critical mass* be reached and *potential winners* confidently pursue their search. *Increasing returns to continued search* then prevail and the risks that winners may get lost are minimized. The competence bloc then functions as an *attractor* for advanced firms that both *benefit* from localizing there, and *contribute* to the further development of the competence bloc. In that sense, the advanced firm of the competence bloc also functions as a technological *spillover source*, or as a technical university (Eliasson, 1996b). The competence bloc transfers valuable and more or less tacit knowledge ("technology") between actors with competence capable of adding value. This transformation takes place in the internal markets for innovation within firms or through trade over external markets between firms. For this tradability in technology assets to be achieved, the problem of establishing property rights to intangible knowledge assets has to be solved (Eliasson and Wihlborg, 2003). Lamoreaux and Sokoloff (2002) in fact argue that institutional support, notably the patent system that "created secure and tradable property rights in invention" was instrumental in commercializing technology and initiating the rapid productivity advance in the US economy 1870-1920. Some large firms internalize almost entire competence blocs to solve the property rights problem, as IBM did in its heyday in the 1970s. It was even an advanced customer of its own products, such as advanced microchips. Most large firms internalize significant elements of the competence bloc, notably the venture capital function. An internalization of the link between the innovator and the industrialist in the competence bloc as shown in Table 3, however, suggests a narrowing of the competence a project is exposed to in the internal firm evaluation (in the hierarchy). Distributing the same evaluation over a competence bloc with many competent actors means a broader and more varied project evaluation, but produces larger transaction costs and introduces an extra element of uncertainty about the distribution of rents. That innovative variety may disturb the operational efficiency of a large hierarchy is illustrated by a quote from a well known Swedish business leader: "We would get very irritated at an entrepreneur at the postal office that delays the morning mail delivery, even though this person has interesting ideas about how to improve postal service...We need some creativity —

[8] The results of Darby and Zucker (2002) illustrate the difficulties of effective selection and the nature of industrial knowledge in the financial community. They find that the quality of biotech firms' science base measured by the number of articles published by academic stars associated with the firm signals economic performance potential of the firm "making it easier to find capital and to obtain it in large amounts"

but not much"[9]. The standard way of attempting to solve that problem is to keep the innovative and operations responsibilities organizationally separate within the firm (Eliasson, 1976).

Thus competence bloc theory is sufficient to demonstrate our first proposition of the critical role played by competent venture capitalists and exit markets to identify and move winners in new technologies on to industrial scale production. Selection has to be decentralized over markets to be truly dynamically efficient[10]. Internalizing the competence bloc into one hierarchy reduces variety and hence the innovative capabilities of the economic system.

3.3 Redefining transaction costs in the EOE

The value of an asset depends on the ability of the owner to control its use (management), to capture its rents (access) and to trade in the asset. Hence, the value can be calculated as the present value of the rent flow net of transaction costs, and discounted by a market interest rate plus an appropriately scaled risk premium (Eliasson, 1998a). Restrictions on the control rights and on tradability are factored into the risk premium. A particularly important matter for the valuation of assets in the EOE is the definition of transaction costs. The mainstream model does not recognize business mistakes. The theory of the EOE does. There, the costs of business mistakes, in terms of Table 2, figure as a cost for learning and economic development contributing to the creation and commercialization of "winners". If incurred within one hierarchy, it belongs to its cost structure, with the important distinction that lost winners are not charged to any cost account. The business mistakes may have been made in other firms, making it possible for a particular firm to learn from these mistakes. The costs are then carried by others or society at large. Costs associated with the commitment of business mistakes thus have to be included in a correct definition of transaction costs in the EOE. This was first recognized by Dahlman (1979). Only then will a market allocation solution to the allocation of resources get a fair theoretical comparison with a centralized hierarchical solution to the same problem. Only then will it also be possible to understand theoretically that a distributed (over the market) reallocation of intellectual assets ("competence capital") often is dynamically more efficient than a narrow evaluation within a hierarchy. Even though more costly in terms of direct transaction costs, the more varied evaluation reduces the incidence of business mistakes and hence total transaction costs, appropriately defined for the EOE. Dynamic, or Schumpeterian efficiency is increased.

[9] PG Gyllenhammar, then CEO of Volvo, at the 90 years celebration in 1986 of the Swedish Engineering Industry Association. For the full quote, see Eliasson (2002b, p.97)

[10] Efficiency or opportunity costs in the EOE can, however, not (as in WAD theory) be measured by reference to a well defined benchmark, i.e. static equilibrium when all actors operate on the production frontiers. There will always be unknown better projects that cannot be "objectively identified". They are only known to exist (Eliasson, 1998b, 2001b). Dynamic or Schumpeterian efficiency (Eliasson, 1985, p.329 and Eliasson, 1991, p.165) is measured against a minimum of lost winners which is indeterminate in the EOE.

The gradual emergence of informed and dynamically efficient markets for corporate control increasingly offers distributed (over the market) solutions to the problem of internalizing the innovative and operational functions of production. Distributing sophisticated production based on tacit competence capital over the market, however, also requires that intellectual capital be competently and fairly valued in markets. For this to occur, property rights have to be competently assigned such that trade can be established in these values at low transaction costs. This particular problem is dealt with in a companion paper (Eliasson and Wihlborg, 2003). Again, competence bloc theory helps us understand and explain how.

4 Integrating innovative and operational efficiency over the market – the second problem

The innovator, the entrepreneur, the venture capitalist (financier) and the efficient large scale organizer of production are rarely embodied in the same person or hierarchy. New, winning ideas are often lost in an efficient manufacturing environment. Hence, the creation, diffusion and introduction of winning innovations in production, the incentives to innovate and to industrialize and the sharing of rents from winners are the critical problems of economic dynamics and growth. The internal economies of large firms are normally conservative and inclined to reject radically new (alien) project proposals, losers and winners alike. The small firm, with the radically new idea, on the other hand, does not have the financial resources of the large firm.

Large, successful industrial economies are often dominated by large firms in mature markets, excelling in efficient volume production. To strike the right balance between efficient volume production and the capacity to innovate, therefore, is as critical for the wealthy industrial economy as it is for the large firm. In the long run, a conservative attitude in the dominant part of the industrial establishment of a nation may be detrimental to the supply and absorption (*receiver competence*, Eliasson, 1986a, pp.47,57; Cohen and Levinthal, 1990; Eliasson, 1990a) of radically new technology. Hence, the organization of markets for innovation is a core economic design problem in an industrial economy.

4.1 On the existence of a market for strategic acquisitions

Outsourcing innovation over an entire competence bloc is one organizational solution to the problem of project selection. This requires the existence of a market for innovations, which is a matter of the existence of venture capital and exit markets (items 4 and 5 in Table 3). The exit market, then, becomes a market for strategic acquisitions, offering a supply of radically new innovations embodied in "small new firms", the innovations having been moved beyond the entrepreneurial stage by venture capitalists, who now supply the exit market with strategic investment opportunities. The existence of such a market for strategic acquisitions cannot be taken for granted. First, rather than being created, selected and carried on to industrial scale production within one hierarchy, the same functions are now distributed

over subcontractors. Functionality, hence (and first), requires the existence of a complete competence bloc that has reached the critical mass and variety to identify and move winners up to and into the exit market, where industrial buyers wait. *Second*, since these activities are now organized over the market, involving trade in intangible knowledge assets, the art of defining, assigning and valuing to make the requisite property rights tradable becomes critical (see accompanying paper Eliasson and Wihlborg, 2003). *Third*, the low internal firm cost of a narrow and often incompetent valuation and selection procedure and the loss of winners have to be weighed against the higher direct transaction costs over the market to achieve a more informed valuation and a better allocation of the total knowledge capital. With the loss of winners included as a transaction cost, the distributed market solution now may become the low-cost alternative.

The *incentives* that move the market evaluation process are not exogenous, but rest on the competence of industrial buyers to understand the projects. Hence, variety among industrial buyers (Eliasson, 1986b) raises competition for the winners and moves their price above the prices offered by incompetent industrial buyers. The high price is critical. Incompetent industrial buyers that have acquired a winner in a distressed situation cheaply can incur large losses by making business errors of type II without privately losing much money (see case below). For the economy at large, the loss of a better and/or a winning production organization may, however, be great.

On the one hand, we have the competent industrial buyers who can pay the right (higher) price for industrially valuable innovators because they know how to create value by integrating them into their business. But innovations are not supplied to order by entrepreneurs and venture capitalists in such markets. On the other hand, we have the industrially incompetent buyers who shop for cheap acquisitions that may, or may not, turn a profit but that often entail a loss of winners because of the industrial incompetence of the buyers. Hence, *many industrial buyers representing a varied competence are needed to support a viable market for strategic acquisitions* (Eliasson, 1986b). Since biotechnology and pharmaceuticals are industries where this market is critical, the current merger activity and concentration among the large pharmaceutical companies are not a good signal in this context. It reduces competition for innovative firms in the market for strategic acquisitions.

4.2 Large systemic productivity gains

The market for strategic acquisitions offers a way for large companies to integrate both innovative activity and economies of scale volume production within one distributed hierarchy, which we will call an extended Coasian firm or a Marshallian industrial district. The combination, if it can be organized, establishes *a positive sum game with systemic productivity gains*. These potential systemic effects also offer incentives for the competent and innovative industrial organizer. Competence bloc theory explains the principles for this in the EOE. Undeveloped markets for strategic acquisitions have been shown to be a handicap for the early stage actors, the innovators, who often have to part with a winner to a financially strong, later

stage actor. But we can also conclude theoretically that if the big companies collude and/or squeeze the prices of strategic innovation offerings, the policy runs against their own long-term interests. On the other hand, a market that induces many large companies to compete for winning projects is the preferred situation for the small innovative company. In underdeveloped markets for strategic acquisitions, on the other hand winners easily go undiscovered and large incompetent companies can pick up a winner cheaply and scrap it at a small loss if it fails. In fact, innovators in a badly developed competence bloc with no market for strategic acquisitions have to be irrationally overoptimistic to go on innovating at large private risk.

4.3 The concept of dynamic or Schumpeterian efficiency

A reference or a bench mark to define and measure efficiency is needed. We need to know the *opportunity cost* of not doing something in a different and perhaps better way. Such a bench mark used frequently among firms is to compare the situation with a best competitor or the best plant in the own firm[11]. Ideally the reference should be the best possible or maximum performance. This is in principle easy in mainstream equilibrium modelling where the (full information, perfect) equilibrium is associated with the notion of maximum achievable performance: if it can be shown to exist, you have a benchmark for efficiency measurement. Standard economic analysis "attempts" to organize its assumptions such that the economic model can be solved for such equilibria or exogenous benchmarks. The problems with this model, and with such analysis, is how it relates to the underlying reality. We have no such principal problem with the theory of the EOE. On the other hand, the EOE has no stable exogenous equilibrium to be used as an efficiency reference, but we regard that as an advantage. Defining efficiency, however, becomes a problem, because the optimum reference or the opportunity cost has to incorporate the hypothetical economic performance of lost winners, had they not been lost. This reference is indeterminate since it depends on all factors ruling the growth process in the EOE, and the basic idea of the theory of the EOE is that far better solutions than the existing ones are possible for those economically motivated to search for them and capable of identifying them. Hence, the model of the EOE cannot be solved for an external equilibrium[12]. The indeterminacy of a reference tilts the policy focus away from the analytical ambition of the WAD model. Instead of using information to determine the best solutions the policy ambition is now to design institutions and instead boost incentives to search for the better solutions and to help build the institutional and human capital infrastructure embodied in the competence bloc to "maximize" the exposure of each project to a competent evaluation. The paradoxical coincidence is that the presence of large information and communications costs in production

[11] Such bench marking in large firms with multiple production facilities of the same kind was common already in the early 1970s (see Eliasson, 1976, pp.180, cases 13).

[12] We can simulate possible better trajectories involving fewer losses of winners, for comparison, using the Swedish micro-to-macro model MOSES, which approximates the EOE (Ballot and Taymaz, 1998; Eliasson, 1991). MOSES is an evolutionary model which develops differently, depending on initial circumstances and the discrete choices made by actors in the model during the simulation, and it never settles on an exogenous equilibrium path Eliasson and Taymaz (2000).

when incorporated in the theory of the EOE is what causes this redirection of theoretical attention away from information towards institutions and incentives.

4.4 Failure in the market for strategic acquisitions

Market failure in the form of lost winners easily occurs in the EOE, and always occurs to some extent if the competence bloc is not complete and/or not sufficiently varied horizontally. We have to watch our tongue, however. What looks like market failure often originates in policy or political failure. For instance, if the tax system makes it impossible for industrially experienced and competent rich individuals to develop into venture capitalists and/or if the wrong people become rich and enter venture capital financing, the critical venture capital competence input in the competence bloc will be lost – a political failure. Similarly, if policy creates a long depression of values in the stock market, making it easy for large and not very competent buyers to shop for bargains, often losing a winner here and there, we have again an instance of policy failure, not of market failure. The most common origin of business failure, however, is lack of competence to perceive the right combination of technologies through strategic acquisitions and divestments. For the acquiring company, the potential value may be much larger than the sum of values the acquisition objects can fetch individually in the market- if it has the competence to do it, not only about right, but exactly right.
Three cases will illustrate the latter aspect in particular.

Case I: Uppsala based firm in molecular diagnostics (Eurona Medicals).

This firm was spun off from Pharmacia in 1994, when Pharmacia decided not to pursue its molecular diagnostics venture, a then pioneering field aimed at making individual genetic diagnostics and personalized medicine possible. This market is now considered to be the promising area for new innovative health care (Eliasson and Eliasson, 2002b). Eurona had two mutually supporting specialties, *substance testing* (lab processes, data base analysis and data access) and *genetic diagnosis*, the second specialty being the by far more innovative and promising venture. Here Eurona was a pioneer, perhaps too early.

Today the average "hit rate" for a substance is some 20 percent, meaning that most patients will score no hits for a while, only suffering from cumulative side effects. Some unlucky patients score no hits and only suffer from the side effects. The business opportunity lies in the fact that the genetic variation between patients makes them react differently (for the same disease) when prescribed the same substance. The potential lies in genetically diagnosing each patient, and tailoring the substance to the patient. The potential of personal medicine is, therefore, considered to be enormous, with equally large life quality improvements to be gained. This possibility, however, clashes with the interest of Big Pharma, that prefers one standardized substance for each patient and illness. Big Pharma do not have the incentives to be pioneers in breaking their large scale producer advantage until challenged by small biomedical niche players that make successful inroads into their markets. Hence, niche players such as Eurona are also a socially valuable competition factor.

Apparently Eurona was too early and/or venture capitalists did not understand the business idea . Even though Eurona announced that its first diagnostics product capable of predicting which patients would respond positively to a particular blood pressure inhibitor would be on the market the same autumn (*Svenska Dagbladet*, June 7, 1999), the thin Swedish venture capital market went dead in 1999. UK Gemini picked up Eurona at a low price from its "supporting" venture capitalists.

Several experts interviewed within and around the company held widely different opinions about the time horizon for take off, from one half year to ten years (Eliasson, 2003). Gemini, a smaller company with money, was primarily interested in the testing competence of Eurona to support its analysis of twins, and shelved (at least temporarily) whatever was left of the personalized medicine project. Gemini was introduced on the Nasdaq in 2000. During an interview with Gemini in late 2000, it was indicated that Gemini probably would have to complement its technology through strategic acquisitions. Seventy percent of the sources of new technology, however, reside on the West coast of the US. In 2001, Gemini was acquired by US *Sequenom* on the West coast, one of the new players in personal medicine, a field now considered one of the most promising in medical businesses.

Case II: Perbio Science

Until recently, Perbio Science was a mostly US based, but Swedish owned, company in biotech supplies, headquartered in Sweden (Helsingborg). Earlier the company had been a division in the Perstorp chemical group, which had acquired Pierce Chemical and Athos Medical in the US during the 1990s. Perbio was spun off to Perstorp's owners in the late 1990s.

Perbio Science considers itself to be the supreme performer in protein cell culture, which accounts for more than 50 percent of sales, the world leader in voice protheses (the Swedish part of the company and 9 percent of sales), and a major player in bioresearch supplies of reagents, kits and services for protein studies to both industry and university laboratories.

Perbio management had long been on the lookout for a solution to its strategic problem of deciding whether to invest and grow organically, grow aggressively through complementary strategic acquisitions or wait to be acquired at a high price. Organic growth was considered too slow and too risky. To be acquired would mean a US buyer only. Europe and Sweden did not have the complementary receiver competence to commercialize the potential and be willing to pay a high price. Complementary strategic acquisition objects, in addition, could not be found in Europe. Lack of local Swedish management competence on which to build an acquisition program was also embarrassing. To grow from a technology base in Sweden, therefore, was no longer considered a viable solution.

There had been an opportunity to create a growth base in Sweden in the mid 1990s. Pharmacia had just merged with US UpJohn and was looking for a partner to Pharmacia Biotech. Discussions were conducted with Perstorp, which saw an opportunity to combine Perbio's world leading cell culture technology with the world leading protein separation technology of Pharmacia Biotech into a global cell-culture company. The management of Pharmacia Biotech, however, considered Perbio too small a player and balked at the plans of Perbio management immedi-

ately to unload the larger but less profitable instrument activity, considered alien to a cell culture company. The instrument activity was also considered a potential financial burden to the new company that would draw disproportionally large management attention and would require very large investments to become profitable , circumstances that would hold back growth in the market segments where the new company would have the best opportunities. Rapid technology development was one reason for the very large investments needed in instruments, an area that was easily overrun by competitors. Instruments, furthermore, did not generate the desired cash flow, but needed the later sales of consumption chemicals. The whole deal evaporated when UK Amersham acquired Pharmacia Biotech in 1997 and renamed the company Amersham Biosciencies, which was in turn acquired by General Electric's Medical Businesses in 2003. GE develops and manufactures instruments, such as medical scanners, that already use contrast chemicals produced by Amersham.

Perbio itself was acquired by US Fisher Scientific in 2003 for 155 kronor per share (*Dagens Industri*, June 27 and August 28, 2003). For Perstorp, the owners of which had acquired Perbio for 35 kronor when it was introduced as a separate company on the Stockholm stock exhange in 1999, this more than compensated for the bad stock market performance of Perstorp itself (*Dagens Industri* Nov. 8, 2000).

The choice menu for business combinatorics is great. Gothenbourg-based Nobel Biocare, a company formed from the diversification of the defence firm Bofors in the early 1980s, opted for the long and risky road of organic growth based on the Brånemark method of titanium dental implants (Fridh, 2002), only to find itself almost overrun in the 1990s by a Swiss imitator. Nobel Biocare sold out cheaply to a Swiss medical investor group when the stock market declined in 2001.

Case III: Karo Bio[13]

Karo Bio is a biotech firm that operates as an intermediary in the markets between large pharmaceutical firms and university research. Even though the company has not fared well in the market recently, it is principally interesting here as a hybrid of market and hierarchical organization. Karo Bio's business idea is to look for and discover business opportunities in academic research laboratories and to develop them commercially up to the stage of "routine" clinical testing, when the projects can be understood sufficiently well for a large pharmaceutical firm to be interested. Karo Bio contributes both entrepreneurial and venture capital competence (see Table 3) to upgrade the commercial value of promising academic research projects. Karo Bio thus represents an intermediate organizational solution to deal simultaneously with both operational focus and innovative variety, through outsourcing the innovative and entrepreneurial function. Karo Bio then lowers the risk of committing errors of both type I and II by exposing each project to a more competent commercial evaluation than would otherwise have occurred. The project is pulled out of a commercially incompetent academic environment and prevented from being narrowly inspected and rejected in a big company environment, and so winners are probably saved.

[13] A more detailed presentation can be found in Eliasson and Eliasson (1997, pp.151).

The complexity of this more varied evaluation is illustrated by the fact that Karo Bio (still) has had (1) to specialize in a few diseases that involve nuclear (hormone) receptors and (2) to form complementary partnerships with academic labs, specialized firms or even industrial customers (see item 6 in Table 3) to broaden its competence base. The problem has even been raised that KaroBio has opted for the wrong screening technology (*Dagens Industri* Aug.20. 2003). The business idea is to make drug screening and discovery more efficient through a more innovative and efficient pre-screening process than that of the big pharmaceutical companies. While the big pharmaceutical companies are excellent at clinical testing of *given* substances for *known* biological effects, this excellence is a foolproof method for missing radically new winners. So Karo Bio looks actively for winners and then applies its own, more efficient methods[14] to narrow the number of promising candidate substances.

Projects may be packaged as a company, but Karo Bio prefers to offer a license deal, thus illustrating the importance of competent customers (industrial buyers). KaroBio claims to understand the potential of a project better than the customer, so why sell it for the low price an "incompetent" customer is offering? If you can finance development yourself, wait and license. Then you can increase the price when the buyer finally apprehends the situation. Again, this also illustrates the importance of a competent venture capitalist, who understands better than the big industrial customer how promising the project really is. Such competence is rare externally, but it exists, and Karo Bio aims for reaching the level needed to be its own sustainable venture capital provider.

5 The existence of a market for strategic acquisitions – the third problem

The big firm has the money but not the capacity to create and to bring radically new ideas to the attention of its decision makers. The small firm/ entrepreneur has the ideas but not the money. In between the two there is the market for innovations (Day et al., 1993), in which radically new ideas are developed as far as is needed for an industrialist to understand the commercial potential. This development is intermediated by the actors of the competence bloc, notably the actors in the venture capital and exit markets. For the little firm to capture the rents of its own innovative capacity (competence capital), it is dependent on the efficient functioning of these two markets. Speedy access to venture capital often decides the outcome. The small innovative firm, therefore, depends more than other firms on the competence of the actors in the financial markets to understand what they are doing.

There are six principally different strategies for the small, innovative firm to pursue (Eliasson, 2002a and Table 4). It can (1) go slowly and organically, at the rate internal finance permits, (2) grow aggressively through external acquisitions, (3) opt for internal growth, based on external venture capital, (4) aim at being strategically acquired by a large firm, (5) develop technologies for licensing or (6) do contract work. The categories in Table 4 correspond to a different assignment of ownership and control rights and/or different contracts, each involving different

[14] For more information on these methods, see Eliasson and Eliasson (1997).

Table 4. Strategic choices for the small innovative firm

1.	Do it alone, slowly on internal funds and risk going bankrupt or being imitated early by a big company.
2.	Grow internally and share the risks and profits with an external venture capitalist, often unfavorably.
3.	Grow aggressively through strategic acquisitions or external venture capital and/or paying with own stock and dependent on the competence of actors in the stock market to value your company.
4.	Aim for being strategically acquired at a high price.
5.	License your technologies.
6.	Do contract work

Source: Eliasson (2002a).

risk. The risk level decreases as you go down Table 4, but potential profits increase as you go the other way. Each strategic choice, or each combination of choices, corresponds to a different definition of the hierarchy or the firm.

Strategies (2) and (3) can be combined. It is quite common among small biotechnology firms (also cf. US high tech firms in Eliasson, 2000, p.234) to aim for internal growth, but to sell out if a suitor offers a sufficiently high price. The most demanding and the most risky, but also the potentially most rewarding, approach of the small innovative firm with a potential inhouse winner is to grow through a combination of early venture capital and own strategic acquisitions to complement its own technologies to reach industrial scale production and distribution quickly. This was the early ambition of Perbio Science above. As we have concluded already, for the risks to be reasonable under this strategy, a vertically complete and a sufficiently varied competence bloc has to be in place. Only then can the potential winner confidently continue searching for new resources on its own. There are increasing returns to continued search. The objectives of a new start- up firm are not independent of its sources of finance and the agreements on risk sharing. There are three principally different ways of funding the commercialization of a radically new innovation (Eliasson, 2002a).

(a) *High Risk* venture (items 2 and 3 in Table 4).
Build the company to industry level on external venture financing.
(b) *Medium Risk* venture (item 4).
Aim for product being strategically acquired by large company.
(c) Low Risk venture (items 5 and 6).
License or do contract work.

The first high risk venture requires the support of a complete competence bloc. The second medium risk venture requires the existence of fully developed markets for strategic acquisitions, notably for bidding up prices of acquired objects sufficiently to establish incentives for innovators. The low risk ambition requires that there are sophisticated and large customers for technology in the market. While the US offers the whole range of options a, b and c, Europe offers c and only to some extent b, but not much of a.

The market for strategic acquisitions allows the small, advanced biotechnology firm to complement its competence and technologies through acquiring a firm or part of a firm. This is a way to increase its rate of growth, compared to internal development of the same technologies and to capture the market ahead of imitators. The large pharmaceutical company can acquire know-how it has been unable to develop internally through firm acquisitions. Small, innovative firms can supply their technologies in the same market at high prices if many big firms compete for their technology. If a profitable selling opportunity arises, the small, innovative firms growing internally through venture capital finance and/or through acquisitions might opt out of that strategy and sell out. The more options, the higher the probability that winners are identified and allocated to the right users.

A strategic acquisition is a means for a firm to solve a particular business problem. It is, however, also a matter of interest for the policy maker, since the non-availability of a dynamically efficient market for strategic acquisitions limits new firm formation both technologically and financially, and, hence, growth. We have shown (in terms of competence bloc theory) how the large firm can internalize "over the market" a dynamically efficient integration of innovative capability and large-scale operations efficiency. Strategic acquisitions, furthermore, are an increasingly important channel of technology diffusion. This time we see an innovative organizational solution that bridges the inability of large operations-oriented firms to be creative and the difficulties of the creative (innovative) small firm to capture the rents from its winning innovations. The market for strategic acquisitions creates value where technology might otherwise be wasted. The venture capital market and the market for strategic acquisitions embodies industrial competence within finance, thereby raising the competence each project is exposed to in the evaluation process of the competence bloc. It is in the interest of all parties in the game (seller, buyer and government) that a competitive market for strategic acquisitions develops where the value of the winner (firm) is bid up to the highest price the most competent acquiring firm is willing to pay. Cheap acquisitions will then be stopped. This market has to be global, and it appears to be the case (see Eliasson, 2001a) that high technology can be acquired at a distance, since only competent customers are in this market. The market for strategic acquisitions enhances the flexibility of choice for the small firm to commercialize winning technologies on their own, and for the large and less innovative companies to access new technologies through acquisitions. This was the third problem.

6 The diffuse notion of a hierarchy – the theory of the firm revisited

The fathers of economics were not really interested in industrial dynamics, but rather in the "higher level" policy problems of Government. The economists of those days were satisfied with discussing technologies and industries defined as aggregates, and possibly factories. The role of live firms in wealth creation was rarely addressed, except as in Smith (1776) referring both to the joint stock company as a socially negative privilege or monopoly, and to the importance of new firm formation for exposing these monopolies to competition.

Industrial monopoly formation and antitrust problems brought the firm into policy focus in the late 19^{th} century in the US, and then again in the 1930s. Industrial organization theory developed from this policy base (Scherer, 1980), but was rapidly (in the 1980s) integrated with the neoclassical tradition. Since there was no place for firm dynamics in static equilibrium, no distinction was made between the innovator, the entrepreneur , the venture capitalist and the industrialist. They were either bunched together in a firm or sector production function or assumed to be fully outsourceable (in so far as their knowledge mattered) in perfect markets (see for instance Fama, 1980).

Coase brought an end to this tradition in 1937, a contribution the importance of which was not realized until decades later. In practice, all the (competence) functions of the competence bloc are now coming apart in the markets in a truly Coasian fashion, and new C&C technology is playing a critical role in making such distributed, still integrated production both possible and profitable . Outsourcing, however, is not the same as the separability of Fisher (1930), which is one of the corner stones of modern financial economics. Fisherian separability is incompatible with dynamic or Schumpeterian efficiency, since striving to reduce transaction costs within the extended firm boundaries involves attempting to minimize the extended definition of transaction costs by reorganizing the limits of the firm. This also takes us outside the mainstream definition of the firm as formulated by Holmstroem and Tirole (1989) since that definition is based on transaction costs minimization over a given firm hierarchy. Integrated production based on modularization and outsourcing over the market can be organized very differently and some of all possible organizational designs exhibit very large, positive systemic productivity gains (Eliasson, 1996b). A systems responsible firm coordinates the whole, and the systems coordinating competence is one of the strong competitive advantages of the advanced western industrial firms. The dynamics of integrated production, however, still diffuse the notion of the firm as a well defined and centrally controlled hierarchy.

Integrated production defines the *extended firm* based in an increasingly sophisticated system of specialized subcontractors. Integrated production requires control rights that can be organized through the assignment of appropriately designed property rights (ownership) and contracts superimposed on physical manufacturing and distribution. The dynamics of contracting and recontracting of the extended firm is, however, moved by people with competence (Eliasson, 1990a), forging temporary configurations of property rights in the market for strategic acquisitions. It is an economically viable entity to the extent it can be configured to lower transaction (read information and communications) costs. This may be possible if (1) the competence bloc is vertically complete and sufficiently varied horizontally and (2) if transaction costs are understood to include the potential loss of winners. The large potential systemic productivity effects that a competent organizer can realize are an incentive for the formation of distributed and integrated production. Hence, there will be a demand for supporting markets for strategic acquisitions to develop. We can also conclude theoretically that the development of such markets for strategic acquisitions to support the free formation of extended firm arrangements will be a contributing factor behind the successful formation of a New Economy. We have

already indicated that deficiencies on this score may be what keeps the US economy ahead of Europe.

7 Is Europe a bunch of laggards?

The markets for innovation, entrepreneurship and venture capital in their developed form (Day et al., 1993) are fairly new. One might safely say that the US is the only economy that features an advanced venture capital industry capable of evaluating and financing large scale, radically new innovative projects (Eliasson, 2003). There are several reasons for this. *First*, the US economy, notably California, has a larger concentration and diversity of wealthy people than any other country, people who have become rich through private industrial activities, notably in the new industries. *Second*, deregulation of the US insurance markets in the 1970s allowed the insurance industry to enter the venture capital market. The supply situation then was dramatically changed for the better, notably through the creation of very deep exit markets. *Third*, the early start of new high technology industries expanded the set of industrially experienced and rich individuals that now populate the venture capital industry. Together, this means that the formation of sophistical markets for strategic acquisitions began in the US. Overcoming the handicap of financial markets lacking industrial experience in Europe is no easy task, and it is not supported by the political ambitions in Europe of making the formation of private wealth through innovative industrial ventures difficult. The scarcity of competent venture capitalists who understand radically new technology might mean that small European start-up firms will have difficulties funding both their own internal expansion and an aggressive expansion through own acquisitions because "incompetent" local venture capitalists take too long to make decisions and/or take too large a share of the capital gains. There will be a bias towards selling out. For a small country, this will probably be to a foreign suitor as was the case with Eurona and Perbio Science. This problem is interesting because both Sweden and Europe are as advanced in both health care technology (Eliasson, 1997; Eliasson and Eliasson, 2002b) and in agricultural biotechnology (Eliasson, 2002a) as the US, but both lack commercial and industrial competence, including venture capital competence, compared to the US. Hence, there might be a bias in the flow of industrialized technology from Europe to the US.

Already in the early 1980s, US venture capital was eying Swedish Pharmacia and Danish Novo, at the time erroneously believed to be on the verge of a technology breakthrough in biotech (Eliasson, 2003). It was also suggested (Eliasson, 1997) that US venture capital be invited to invest in Sweden, to compensate for the lack of commercial and venture capital competence in Swedish health care. Foreign venture capital would help create a market for strategic acquisitions, raising the economic value of locally developed technology that might otherwise be wasted.

One could argue that the European economies at least feature a large number of potential industrial buyers in the market for strategic acquisitions. This positive factor is, however, diminished by the relative dominance in Europe of old, mature and most likely conservative firms. There is a reason for this. Legal rules and policy

makers in Europe bias incentive systems in favor of large firms, meaning, by definition, a bias against the small, innovative firms. One reason for this negative bias in incentive systems has been the political ambition in some countries to control private industry, which can only be accomplished if the firms are few and large (Eliasson, 1998a, pp.64 ff.). Another reason has been a concern about unemployment and the assumed protective internal labor markets of large firms. In conclusion, then, the *receiver competence* at the economy-wide level, or the capacity of the economy at large to take on and build new businesses on new technologies, is not only deficient in Europe compared to the US because of incomplete and horizontally less varied competence blocs, but also because of a political reluctance to allow the markets to push freely for change. Europe, therefore, is more exposed to the risks of committing business mistakes of type II (i.e. losing the winners) than the US. The gestation period to correct the situation (build competence and change policies) and to see positive results may, however, be too long for political patience to survive. The policy catch is paradoxical. Austrian/European economists were the first to realize the nature of a dynamically growing economy. This understanding has been washed out in mainstream textbook economic theory and research in favor of an economic theory refined to perfection in the US that is more a theory of central planning than it is of a dynamic economy. But real industrial dynamics is to be found in the US, more so than in Europe.

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