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Varieties of Vertical Disintegration: The Global Trend Toward Heterogeneous Supply Relations and the Reproduction of Difference in US and German Manufacturing

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As is well known, there is a global trend toward vertical disintegration in many manufacturing industries. Large manufacturing firms are radically reducing the amount of their product that they both produce and design themselves. Instead they are turning to suppliers for key design, component, and even system inputs. This shift has created a great deal of business for specialized suppliers in a vast array of areas throughout the global manufacturing economy. But it has also created an entirely new and challenging—often quite contradictory—terrain of relations between suppliers and their customers. Our claim in this chapter is that relations between suppliers and customers in manufacturing are becoming systematically more heterogeneous within all advanced industrial societies. Further, this global trend is exacerbated by the diversity of institutional architectures and production practices in different political economies. In making this argument, we show that neither neoliberal nor particular forms of institutionalist arguments (in particular the Varieties of Capitalism, VoC, perspective) adequately capture current global dynamics in manufacturing.

The chapter is in three sections. The first describes the changing dynamics in the purchasing strategies of large manufacturers in the

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advanced industrial countries. The second section then constructs a typology of the range of supplier–customer relationships that seem to be emerging in the contemporary global manufacturing environment. The third section then moves to a discussion of the way in which these relationships are being realized in different national market contexts, in particular the United States and Germany.¹

11.1. Changing Dynamics in the Purchasing Strategies of Large Manufacturers

For over a decade now, the literatures on the automobile and electronics industries have been preoccupied with the process of vertical disintegration in production (Borras and Zysman 1997; Clark and Fujimoto 1991; Liker et al. 1999; McKendrick et al. 2000; Sturgeon 2002; Womack et al. 1990). Recently, observers of lower volume sectors of manufacturing, such as the production of agricultural equipment, construction machinery, and other forms of industrial machinery have also been describing this phenomenon (Mesquita and Brush 2001; Whitford 2003). The contemporary logic of vertical disintegration is the following. Due to intensifying global competition, rapid technological change, shortening product life cycles, and greatly variegated consumer demand for product customization, the spatial, financial, manpower, and organizational resources of firms become overtaxed and cannot respond efficiently. In order to save time and resources, diversify exposure to risk and enhance flexibility, Original Equipment Manufacturers (OEMs) concentrate their activities on so-called ‘core competence’ areas—that is, on particular functions, such as marketing or overall styling and product design, and/or on particular aspects of the manufacturing process in which they hold a competitive advantage or have valuable, difficult to replicate, expertise (Prahalad and Hamel 1990). In all other areas outside core competences, OEMs rely on suppliers to contribute essential components, systems, and aspects of product development.

This change in the purchasing strategies of OEM firms has not simply increased the amount of business available to component

¹ The primary empirical foundation for this chapter is nearly 100 interviews conducted by the authors at manufacturing firms, trade unions, regional governments, and trade associations in the United States and Germany since the year 2000. All references in the text to case examples not otherwise indicated stem from this research.

suppliers and other specialists. Rather, it has also dramatically changed the kinds of demands that OEMs place on them. Suppliers are now expected to

- (1) provide their customers with significant know-how (in the form of product design and/or manufacturing expertise);
- (2) produce at extraordinarily high levels of quality (fewer than 100 defective parts per million is increasingly standard);
- (3) provide a variety of services for the customer (in the shape of logistics and subassembly);
- (4) all while continuously reducing the cost at which they provide these things.

Moreover, customers do not simply trust that their suppliers are doing these things. Even long-time customers are now subjecting their traditional suppliers to constant benchmarking procedures, which place their performance in comparison to 'best practice' in their market. Importantly, this is not simply a disciplining tactic on the part of newly dependent OEMs to protect against potential supplier opportunism (though it can have that effect). Rather, even in cases where there is extensive collaboration and mutual dependence between customer and supplier, constant benchmarking, and comparison of supplier performance and capabilities stems from the OEMs' urgent need for information about new developments in technology and manufacturing practice. Because they are increasingly dependent on outside knowledge of these things, and because their future technological and manufacturing needs are uncertain and always subject to change, the process of surveying suppliers has become a crucial mechanism for learning for the customer firm (Helper et al. 2000; Sabel 1995).

As a result of all of this surveying, benchmarking, and comparison on the part of OEMs, suppliers, as we shall see below, must learn to live with the paradoxical reality of customers becoming both more reliant on them for know-how and manufacturing input, while they simultaneously become more demanding and actively survey (and contract with) the suppliers' competitors for newer, better, and lower cost alternatives.

Finally, it is important to emphasize that even though the trends toward vertical disintegration just described are unmistakable, the practices of OEMs in manufacturing are far from uniform. There are at least three significant aspects of the situation in which OEMs find themselves that produce broad heterogeneity in their practices in production and in relationship to suppliers (Herrigel 2004).

First, many OEMs are very large multinational corporations with far-flung operations involving multiple plants and production facilities in many locations. Moreover, such firms produce a broad and wide array of products and models across those far-flung plants. Companies of this scale and complexity do not vertically disintegrate massively, all at once, and in toto. Instead, they seek to do it piecemeal in locations where it is very easy to do, or where it is most urgently needed—or they introduce new models as ‘experiments’ with disintegrated production in locations where there will be no entrenched in-house opposition. In other production locations, or with respect to a particular product model, where internal resistance to disintegration is great or where in-house production continues to be profitable or where suitable suppliers are unavailable, vertical disintegration does not occur.

Second, even in cases where it is clear that an OEM does not view a particular aspect of production as possessing special long-term competitive advantage for the firm, it may nonetheless retain some internal production capacity in that area simply to retain some in-house know-how and enhance its ability to engage in knowledgeable collaboration with (and evaluation of) outside suppliers. In-house production facilities can be made to bid on projects against outsiders to facilitate this. In some cases the supplier could win the bid and be brought intimately into the development process of a model, while in other cases the in-house unit is the victor. This kind of competition between in-house and external suppliers can exist for extended periods of time, with the outcomes continuously changing and unpredictable (Bradach and Eccles 1989).

Third, heterogeneity in practice with respect to suppliers arises out of the sheer complexity of the contracting that vertical disintegration in production produces for any given model or product—and the content of heterogeneity changes over time. OEMs seek to gain cost savings and know-how from their suppliers. But it is not necessarily true that the OEM seeks to maximize both of those goals in every contract with every supplier every time. For example, a buyer for an OEM may need to achieve certain aggregate cost reduction targets on a particular model and he/she can achieve those targets by using leverage with one or two suppliers (or helping them achieve leverage) or by bidding out a relatively standard or mature component or subassembly that had been designed and until then produced by a particular specialized supplier. This move to push a supplier further away, however, can be undertaken to create space for OEM engineers

to engage in a valuable but relatively expensive collaboration with another supplier of a different component or subassembly for the same product.

Thus, the same OEM on the same product model may be engaging in a variety of different sorts of relations with suppliers simultaneously. And, as the product is redesigned, OEM behaviour toward suppliers may change—those pushed away may be offered greater intimacy (and better margins), while the intimate partners of the past suddenly find themselves having to bid on their own designs against competitors. As we will see, suppliers learn to participate in this kind of waltz with their customers, often agreeing to (or offering) a cost reduction that ruins the margin of profit on one contract in exchange for future business with the customer, at a better rate.

All of these examples are intended to show that although the evidence is incontrovertible that there is a secular trend toward vertical disintegration in manufacturing across industries world wide, this has in no way produced uniformity in the practices of OEMs across industries, within industries or even within single firms and plants. There are multiple and changing strategic calculations in play. In the following sections, we will attempt to outline the range of relationships that seem to be emerging and the differing contributions of national context in their emergence and governance.

11.2. Typology of Emerging OEM–Supplier Relations

These changes in the kinds of demands that are being placed on suppliers have given rise to a great deal of turbulence in the way in which relationships between OEMs and suppliers are constituted. We suggest that vertical disintegration can produce (at least) five ideal typical forms of customer–supplier relations in manufacturing:

- arm’s-length/spot market relation
- autocratic or captive supplier relation
- contract manufacturing
- collaborative manufacturing
- sustained contingent collaboration.

These differ in terms of the division of labour between design and production on the one hand and in the roles that customers and suppliers play in the relationship over time. The first four types all involve supplier production, all have clear role divisions between customer and

supplier over time, but they vary in the amount of design the supplier engages in and the production the customer engages in.² The fifth type has neither a stable division between design and production, nor a clear role division between customer and supplier over time. Our claim is that the environment is such that it is possible to find each of these relationships in practice today, but that types 3, 4, and 5 are the most historically distinctive, and type 5 in particular seems to be rapidly emerging as the most stable and modal relation.

11.2.1. *Type 1: arm's-length /spot market relation*

For much of the twentieth century in many of the most developed industrial economies, vertical integration was a dominant strategy in capital intensive manufacturing industries. In this context, the typical supplier relationship was an arm's length one in which the price mechanism in the market governed the logic of exchange. In this kind of relationship, suppliers either constructed complex parts according to designs made by the OEM, or they sold commodity or standardized products to the OEM. In both cases, the relationship was characterized by a strict division between product development and production and by a strong emphasis on price. Contracts went to the lowest bidder.

These relationships continue to exist in the current environment of increasing vertical disintegration, though now they exist as one of several different kinds of ties between suppliers and customers, and tend to appear under relatively specific and quite constrained conditions. In all cases of spot market subcontracting, the competences between customer and supplier are very clearly defined and the contours of the desired component are very precisely specified. In particular, no customized design input from the supplier is needed. There is neither ambiguity nor competition between customer and supplier on their respective roles in the process of developing and producing the customer's product. At the margin, components that can be produced within this kind of relationship have a great potential to migrate to low cost production locations. But there are also many countervailing trends such that one still finds significant amounts of this kind of contracting taking place among customers and suppliers in high wage regions.

² Our first four types are consistent with those developed in Gereffi et al. 2005.

11.2.2. *Type 2: autocratic or captive supplier relations*

This kind of relationship exists in only very specific contexts, quintessentially within Japanese keiretsu networks. Here, the competences in design and production of the supplier and customer are complementary, but the relationship is hierarchical. The supplier is typically dependent on a single customer, and follows the lead of the customer in design and production. The contours of the product can be uncertain at the beginning of the relationship, but the solution to design and manufacture problems follow the lead of the customer and there is no ambiguity on the distribution of returns. In the Japanese case, such relationships are possible because suppliers are integrated in a larger Keiretsu network which structures the flow of resources among a large end assembler and its suppliers (finance, technology, skilled labour, etc.). Cooperation and flexibility among the players within this context is high and improves over time as the constancy of the tie (neither supplier nor OEM have alternatives) allows for learning and continuous improvement in the joint undertaking. Moreover, the moral hazard risks typically associated with bilateral mutual dependence are significantly mitigated due to mutual embedding of the supplier and customer in the keiretsu network (Nishiguchi 1994; Nishiguchi and Brookfield 1997; Smitka 1991).

In many ways, these relationships resemble vertically integrated relations, and as a consequence it is not surprising that they seem to be under significant stress in the contemporary environment (Dyer et al. 1998). One very important limitation in the captive relation is that its practical business ties to specialists and bearers of know-how outside the network of dependent producers, much less outside the industry, is limited. While learning occurs through the process of joint problem solving among the dependent parties, neither party seeks analogous relations with competing specialists or customers in order to survey the terrain of technology and practice.

11.2.3. *Type 3: contract manufacturing*

The distinctive feature of the customer–supplier relation here is a clear and unambiguous separation between processes of product design and product manufacture. OEMs (or ‘lead firms’) do the design (and also marketing and distribution) and award production contracts to sophisticated suppliers who conduct and coordinate all of the production and assembly of the item. There is virtually no supplier

input into the design of a product, but there can be interaction and negotiation between supplier and customer in the process of applying designs to manufacturing processes. Customers undertake no production.

As such, there is a strong mutual dependence between customer and supplier within this type and relationships can be long term and grow stronger over time. On the whole, this clean separation is made possible by a far-reaching standardization and modularization in the base technology of the sector. Products are composed out of modules with distinctive content, interlinked by standard interfaces. Indeed, nearly all of the hardware components manufactured by suppliers is in some way standardized—volumes are very high and supplier competitiveness hinges strongly on its capacity to achieve leverage. The quintessential realm for contract manufacture in the contemporary manufacturing environment is product level electronics (computers, consumer electronics, etc.) (Lüthje 2002; Lüthje and Sproll 2002; Sturgeon 2002).

The relationship between OEM and supplier in this relation is very close, but limited. In some ways, the limitation allows for the deepening of the relationship over time. Because suppliers have no ambition to design and customers have no ambition to produce, both have an incentive to work together to exploit one another's strengths. Unpredictability and instability in this relationship is introduced by two factors: the desire on the part of OEMs to avoid capture by powerful contract suppliers and the need on the part of both parties to seek alternative customers and suppliers as a way to survey the relevant terrain in their sector for emergent technological and organizational possibilities (Adler 1995; Chesbrough 2004; Leachman and Leachman 2004; Sturgeon and Lee 2004). Both of these factors push OEMs to limit their commitments to a single supplier or even to a stable pool of suppliers in the interest of gaining technological and cost reduction leverage. For their part, contract suppliers search the terrain for additional technological and organizational possibilities as well, causing them (opportunity cost) to bound their commitments even to their most trusted and reliable customers. In the long run, this search process is not only valuable to the individual development of customer and suppliers; it can also strengthen the ongoing relationship between the parties because what each learns from its relations with others allows them to contribute more creatively to mutual projects. In the short run, however, such mutual searching creates difficulties as finite quantities of work have to be parcelled between traditional and new

suppliers (customers). Compromises and concessions on all sides must be made and this can produce considerable heterogeneity in the quality of relationships.

11.2.4. *Type 4: collaborative manufacturing*

This is the limit case in the global trend toward vertical disintegration, if you map the first four types on a power/coordination scale (Gereffi et al. 2005). The relationship differs from the captive supplier relationship in that there is near parity in the power balance between customer and supplier: each depends on the other for the definition and production of the desired part, and both bring know-how to the relationship that neither could nor would be interested in acquiring on its own. Thus, competences are fully complementary and leverage is counterbalancing. Collaborative manufacturing also differs from the contract manufacturing relationship in that the competence and capacities of both parties are jointly indispensable not only for the production of a desired component, but for its design and development as well. In this limiting case, collaboration begins as a joint exploration of the possibilities for the definition of a product between customer and supplier; neither party has a clear idea *ex ante* what the precise contours of the final product of the collaboration will be, nor of its specific articulation or interface with the overall design of the end product. But both parties recognize that they require the competences of the other and their collaboration defines the content of both design and production. As a result, the collaborating parties view the outcome of their collaboration as a joint product from which equal rents should be drawn.

As a type of relation between customer and supplier, collaborative manufacturing is defined by the systematic integration of development and manufacture between the parties. Both bring competence in both to the joint project. This distinctive characteristic of the relation, however, is also what makes collaborative manufacturing a limiting case in the typology. While it is possible to imagine stable collaborative manufacturing for the life of a particular joint product, it is extremely difficult to identify conditions under which relations between customers and suppliers could be characterized by full integration of production and development capability over multiple contracts over time. In part, the explanation for this is the same one that contributed to creeping heterogeneity within the contract manufacturing relation: the need to enlarge the pool of ties in search of new possibilities is

in tension with the reality of a finite amount of work and capacity at any given time. Through their efforts to learn, in other words, customers and producers are forced into trade-offs and compromises in an effort to preserve old ties while developing new ones (Sabel 2004; Whitford 2001). This invariably leads to the separation of development and manufacture between customer and supplier. Customers vary the quality of the contracts they establish with a single customer, some involving full blown collaboration, others involving only manufacture or more limited collaboration on design, in order to expand the number of potential suppliers it has available for collaboration. As such, over time and multiple contracts, collaborative manufacturing as a type has a very strong tendency to degenerate into our fifth and final type, sustained contingent collaboration.

11.2.5. *Type 5: sustained contingent collaboration*

If the collaborative relation is the limit case in the current environment, sustained contingent collaboration is the modal one. This relationship can only be understood as a tie that exists between customer and supplier over time. It emerges under conditions where both customer and supplier have important capabilities in both design and production. This makes role definition a central point of negotiation between the contracting parties. As we saw above, collaboration is one limiting—and reproducible—moment within a sustained contingent collaboration. But the definition of roles turns out to be much more heterogeneous within a relationship of sustained contingent collaboration due to two factors (both already mentioned) in the current global competitive environment:

- (1) the tendency of both customers and suppliers in the process of searching their environments for new technological and organizational capacities to vary the quality and character of their relations with even their most valued partners in the interest of expanding the size of their pool of ties/partners;
- (2) the fact that the volatile, complex, and non-simultaneous character of product change in the current environment leads OEM firms to separate their aggregate goals for the outside acquisition of know-how and cost reduction from the particular relationship that they establish with individual suppliers.

The mutual desire for access to outside capability results in variation in the intensity of the tie between customer and supplier over time

and across projects. Because both customer and supplier have both development and manufacturing capabilities, the parties can negotiate on the definition of the roles they will play in each contract round. A customer and supplier involved in intense and intimate collaboration on one project may opt for a more limited relation (perhaps the supplier manufactures a component according to someone else's designs) for a different project on a different product. The variation allows each party to seek rewarding ties to others without exhausting their own capacities and while also avoiding the possibility that their relations will be entirely severed once the older, very intimately collaborative, project runs out. The more flexibly partners can vary the roles they play, the greater is their capacity to search their environment for innovation and the more enduring can their relations with any particular partner be over time.

Thus, the first factor above explains how a relationship between a single customer and supplier that is variously constituted over time can nonetheless be thought of as a sustained collaboration. The second factor helps to elaborate how such collaboration can also be contingent. OEMs maximize the know-how gains and cost reduction contributions they receive from suppliers at an aggregate level, rather than at the level of each individual supplier relation, because it gives them more flexibility. In many cases, they attempt to realize both cost reductions and know-how gains in the same relationship through collaboration with the supplier. But in other cases, circumstances may be such that the OEM would like to lure an attractive specialist into its pool of suppliers, so it will be willing to pay a premium for that specialist's know-how. In order to meet aggregate cost targets for the whole product, however, such a move will have to be compensated by significant cost reductions from other suppliers in the pool. The OEM can use its market power, leverage, or very frequently the promise of more lucrative work in a subsequent round to extract extra cost concessions from suppliers.

This kind of multiple goal contracting with suppliers engenders significant role ambiguity and hence contingency and even conflict in the character of relations between suppliers and customers. Suppliers are never sure what role they will play, or even are playing, at any moment in time—will they be courted for their know-how, integrated into a collaborative process of combined development and cost reduction, or will they simply be pressed for cost concessions on components that were once understood to be one of the previous two categories? OEMs foster this ambiguity because it is in their interest to have

a supply base with broad capacities. Good suppliers should have both technological know-how and a skilled understanding of how cost can be eliminated from their role in the supply chain. Suppliers, naturally, resent providing cost reductions because it threatens their margins. Hence, they continually resist OEM pressures by attempting to define their role as a know-how-providing, premium-deserving, collaborator. It is in the OEMs interest to allow the supplier to succeed sometimes in their counter-arguments regarding their role (otherwise they risk losing the supplier and its know-how). It is also in the supplier's interest to develop the skill of being able to supply cost reduction when demanded without such reductions irreparably damaging the supplier's margins. If it cannot do this, the OEM is likely to regard the supplier as unskilled and too costly to keep within the pool of suppliers. Strategic interest in the present and concern for future business make customer supplier relations into a sustained contingent collaboration.

11.3. Vertical Disintegration in National Context

In this section, we argue that producers in both Germany and the United States are struggling to construct and govern the array of relations we have outlined in the previous section. In particular, we will focus on efforts to construct our modal type, sustained contingent collaboration, and suggest that this is emerging as the norm in both countries. But the difficulties that firms encounter in constructing and governing these relations, while overlapping, are not identical in each economy. The institutional and experiential resource base (*habitus*) for producers is different so the distribution of possibilities, strengths, and weaknesses in capabilities and competences, is different (Bourdieu 1977; Dewey 2002). Sustained contingent collaborations are prevalent in both the German and the US political economies, yet they are entwined and enacted quite differently in both societies.

In this sense, we agree with the institutionalist claim, against neoliberalism, that there is variety or diversity in the forms of capitalism in the contemporary world (Berger and Dore 1996; Hall and Soskice 2001; Hollingsworth and Boyer 1997; Whitley 1999; Yamamura and Streeck 2003). Nonetheless, it is important to see that our argument departs quite substantially from the claims of a central school of contemporary institutionalism, the VoC approach pioneered by Peter Hall and David Soskice (2001) and their colleagues and collaborators, in two ways.

First, we reject the strong Hall and Soskice argument that societies are endowed with comparative institutional advantages (Soskice and Hall 2001: 36–44). For Hall and Soskice, successful German OEM manufacturers, because they are embedded in the institutional architecture of a ‘coordinated market economy’ (cooperative labour relations, corporate governance with labour participation, patient capital, regulatory law), are most likely to construct cooperative (nonmarket) relations with both labour and their suppliers and pursue competitive market strategies that are characterized by product quality and incremental innovation. By contrast, because US OEM producers are embedded in the institutional architecture of a ‘liberal market economy’ (conflictual labour relations, capital dominated corporate governance, a financial system concerned only with profitable return, and strict contract law), their labour and supply chain relations will be distant and arm’s length, characterized by conflict, wage, and price pressure, all of which divert producer attention from gradual improvements and incremental innovation (Casper 1995, 1997, 2001). As section 11.3.1 will report, however, this is not what the available evidence shows regarding supplier relations in both countries.

Second, we also reject the related, but not identical, institutionalist claim that national institutional systems change in path dependent ways. That is, in the absence of a significant exogenous shock such as a war or terrible economic catastrophe, the coherence of institutional complementarities within a national architecture of institutions encourages actors to seek solutions to governance problems that are compatible with (if not reinforcing of) existing arrangements and constrain them from adopting governance solutions that are ‘fundamentally’ incompatible with those arrangements (Pierson, Mahoney. Also compare Crouch, Deeg, and Hancké and Goyer, Chapters 7, 2, and 3, respectively, this volume).

In what follows (S. 11.3.2), we will show that different kinds of actors in both the United States and Germany are to a surprising extent neither significantly constrained nor especially enabled by the institutional architecture of the political economy. Indeed, in many ways the institutional architectures in both the United States and Germany, as coherent systems, have been overtaken by events and stand awkwardly by, as various actors seek to construct new relations and forms of governance alongside them. This is not to say that there are no efforts to reform or adapt existing institutional arrangements to changing circumstances. There are (Boyer 2003; Jürgens 2003;

Thelen and Kume 2003). Nor do we want to claim that actors are entirely ignorant of the normative dispositions constituting institutional rules. Far from it! In crucial ways we find that they are guided by these dispositions (esp. Dewey 2002: 14–88). But we find both that actors act independently of institutional incentives and constraints *and* that they try to use institutional mechanisms in new or unstandard ways in order to achieve their governance ends—that is, that they try to change the incentives and constraints that institutions provide to make them more suitable to the new context.

Stated in a positive way, rather than looking, as institutionalists do, for structural constraints or enablers, we view the social terrain of the economy in the United States and Germany as peopled by a community of reflexive agents, beset by common problems of their own definition (though not necessarily of their own making), seeking to construct solutions to the problems they encounter in practice. And, rather than looking for institutional complementarities between system parts and greater and less ‘coherence’ for the system as a whole, we conceive of the (very different) institutional architectures of the political economy in the United States and Germany as constituting sets of resources for actors to use, not use, deconstruct, or redefine in their efforts to contend with the problems of industrial transformation that beset them in practice. In our view, institutions help actors solve governance problems. If they do not solve (or even address) the problems that actors have, then institutions are either ignored or changed.

At the end of the day, experimentation upon the social terrain of OEM supplier relations in both the United States and Germany is very widespread, and there are many different kinds of ‘solutions’ to the governance problems posed by the new production relations being constructed. In the conclusion, we suggest that this process of experimentation is slowly recomposing the institutional character of the political economies of both Germany and the United States in ways that nonetheless reproduce significant differences between the two political economies.

11.3.1. *Sustained contingent collaboration in Germany and the United States*

We constructed sustained contingent collaboration as a type in section 2 based on qualitative observation of supplier–OEM relations in both the United States and Germany, so we are convinced that this type of

relation can be found in both countries. But there is no reason to take our word for it. Indeed, there is a strong presumption within the VoC camp that relations in the United States and Germany will systematically diverge, with German relations likely to be more cooperative and US relations likely to be more arm's length and market defined. Appeal to some neutral and broadly representative data would therefore seem to be in order.

Numerous quantitative studies have been undertaken over the course of the last decade to determine the extent to which supply relations in manufacturing (particularly in the automobile industry) have become more collaborative and structured by the precepts of 'lean manufacturing' (low inventory, low work in process, early supplier involvement in product design, team work, transparency on costs between supplier and customer—etc.). Happily for us, most of the evidence is extremely contradictory. Researchers find conflict and collaboration, trust and distrust almost in equal measure in both societies.

Sue Helper, for example, in studying supplier relations in the US automobile industry, has repeatedly found that many US suppliers are being asked to engage in product development, are being incorporated earlier into the product development process and have adopted a wide array of cost reducing and transparency enhancing arrangements in production (Helper and Sako 1995, 1998; see also Luria 1996*a,b*; Whitford and Zeitlin 2004). In comparison to the conflictual and arm's length practices of thirty and forty years ago in the United States, there is a remarkable amount of cooperation in contemporary US manufacturing. But Helper also finds that US suppliers have a low level of trust in their customers. Many feel that their relationships with customers involve one-way exchanges of know-how. Customers press supplier margins in the name of mutually beneficial cost reduction. Customers solicit innovative design from their suppliers only to shop those designs around to supplier competitors. And, OEM requests for just-in-time delivery are experienced as inventory shifting rather than inventory eliminating moves on the part of the OEM (see Dziczek et al. 2003).

For Helper, the contradictory character of this evidence is viewed as a marker for the incompleteness of the transition to lean production in the United States and above all as an indication of the legacy of arm's length contracting in US manufacturing for much of the twentieth century (Helper 1991; Helper and Sako 1995, 1998; Whitford and Zeitlin 2004). From the perspective of the VoC school, such contradictory data

is evidence for the strength of the market tradition in the United States and the absence (or weakness) of institutions capable of sanctioning self-dealing in non-market relations (Casper 2001). From our point of view, however, the contradictory impulses observed in Helper's findings provide evidence for the kind of sustained contingent collaboration relations we believe are being systematically created in today's competitive environment in spite of the institutional arrangements encouraging or discouraging particular forms of behaviour in the particular society (Whitford 2003). The challenge for producers in the United States, we will see, is to create forms of governance that allow them to cope with the contradictory pressures being generated.

Evidence is similarly contradictory in studies of German manufacturing supplier relations. One very extensive study, conducted by three major economic research institutes in Germany at the end of the 1990s of the automobile, electrical, and mechanical engineering industries, found that German suppliers were indeed being asked to participate in product development at much earlier stages than they had been in the past (Fieten et al. 1997). Forty one per cent of automobile suppliers, 44.4 per cent of electromechanical industry suppliers and 47.1 per cent of mechanical engineering industry suppliers indicated that they were involved in intensive cooperation with other firms (though not all of these collaborative ties were with their direct customers) (Fieten et al. 1997: 232–8, table 235). The survey also indicated that production cycle times were drastically declining across the supply base and that suppliers were adopting production level procedures (longer machine utilization rates, cross-functional teams, ISO 9000 certification) to create greater cost transparency, improve quality, and lower inventory (Fieten et al. 1997: 152–75).

Yet, at the same time, the survey also showed that over 91 per cent of all surveyed firms in all surveyed industries ranked price pressure from OEMs as the greatest problem for suppliers; 61.1 per cent said that inconsistent delivery terms were a significant problem and 47.6 per cent said that OEMs were forcing them to hold inventory (rather than seeking to eliminate it from the supply chain) (Fieten et al. 1997: 152 *ff.*). Of those firms engaged in collaborative research and development with their customers, 57 per cent said that they were partially compensated (as opposed to fully compensated) for their efforts. Nearly 50 per cent of firms with fewer than 100 employees indicated that they typically received no compensation at all for their research contributions (Fieten et al. 1997: 282–3). In addition, the report notes that 42.9 per cent of all German automobile suppliers

complain of customers shopping the supplier's designs around to their competitors (Fieten et al. 1997: 289).

As in the American case, the evidence here is strikingly contradictory. German suppliers are engaging in collaborative relations, but there is considerable conflict and struggle among the producers for the rents from the relationship and significant variety in the quality of relations. Seen with the institutionalist lenses of the VoC framework, this kind of contradiction within a coordinated market economy is a sign of systemic distress. The system of constraints and enablers is not functioning in a way that inhibits the diffusion of arm's length market relations in Germany. We agree that the constraints and enablers are not working in this way, though given the fact that there is considerable cooperation in the United States where there are no institutional incentives for it, it is unclear to us that even the cooperation observable in German OEM-supplier relations is in any significant way traceable to the 'beneficial constraints' of the institutional architecture in the German coordinated market economy (Streeck 1997). From our point of view, the evidence fits very well into the logic we have attempted to portray of sustained contingent collaboration. The challenge for German producers is to construct forms of governance that enable them to cope with the contradictory character of the current situation.

Judging by the evidence presented, it seems fairly clear that both German and American manufacturing supplier relations today have strong elements of both conflict and partnership within them. It is also clear that the institutional architectures in each of the political economies are not only achieving the outcomes they are thought to be able to produce; they are also allowing for the achievement of those that they are not supposed to produce. For us, this is a sign that in order to understand the character of practical, relational, and institutional recomposition in Germany and the United States one should not start by observing the performance of institutions. Instead, one must begin by looking concretely at the efforts of both suppliers and OEMs to cope with the contradictory character of their situation.

11.3.2. Coping with the problem of sustained contingent collaboration in Germany and the United States

The situation that confronts both US and German suppliers and OEMs in the context of the trend toward vertical disintegration and the emergence of sustained contingent collaboration as the modal relationship

between OEMs and suppliers is one of continuous change in the character of relations, technology, specific workplace arrangements, skills, markets, etc. Actors (and regions) unable to cope with this kind of environment are unlikely to reproduce themselves. In this context, there are two different governance problems for which actors in both societies have had to devise mechanisms to cope: the problem of initial learning and the problem of cost reduction.

By initial learning, we refer to the processes by which producers acquire information and know-how in order to be able to participate in the new style of relationship. How do firms learn, for example, about new style production arrangements (team work, cellular manufacturing, low work in process, etc.) and services (just-in-time delivery, subassembly, logistics) that are needed to participate competitively in the new supply chains? How are they able to develop the capacity to participate in collaborative design and product development? By cost reduction, we refer to the strategies and procedures suppliers and OEMs use to organize the generation of continuous cost reductions in production. Analysis of both of these problem areas will reveal some commonalities but also significant differences in the way in which producers in the United States and Germany cope with such demands.

11.3.2.1. *Initial learning*

Prior to the onset of the trend toward vertical disintegration in the 1980s, the majority of supplier and OEM relations in both Germany and the United States were primarily of the type 1 variety: that is, short-term, arm's length relations in which suppliers either produced standardized commodity products or produced overflow capacity for OEMs during periods of peak demand. On the whole, price was the determining factor for sales in old style manufacturing supply chains in the United States and Germany. OEMs were very vertically integrated and supplier structures in both countries tended to be divided between a relatively small number of large standard component producers, such as Robert Bosch or Borg Warner in the automobile industry and multitudes of small and medium-sized contract shops engaged in capacity subcontracting (Birou and Fawcett 1994; Helper 1991; Kwon 2002; Schrader and Sattler 1993).

For the bulk of supplier firms in both economies, the trend of vertical disintegration and the shift toward sustained contingent collaboration has therefore involved significant pressures to upgrade their technological capabilities, production quality, service delivery capacities,

and internal cost management procedures. This has pressed suppliers into large investments in new engineering personnel, to profound recomposition of their manpower usage and training practices, and to the reorganization of the work flow in production, forward to the customer and back to their own suppliers. Mechanisms and methods facilitating this adjustment in both the United States and Germany have been parallel but systematically divergent.

Initially in the United States, OEMs themselves invested significant direct effort and cost in the form of 'supplier development' to instruct their suppliers, one by one, in the new techniques (McDuffie and Helper 1997). This, however, is a mechanism that has begun to disappear. Supplier development was always accompanied and supplemented by consulting services that firms could acquire over the market, and these practices continue (though they are often too expensive for many smaller firms to make extensive use of). Additionally, firms with the resources (and some without them) sought to acquire knowledge of the new techniques, and also new competences in technology and service, through the acquisition of complementary firms and/or rivals in the market. The pressures placed on supplier firms by OEMs to enhance their development capabilities has led to significant mergers and organizational recomposition in the industry, at all levels, as actors have sought to create entities capable of efficiently participating in sustained contingent collaborations.

The market is a traditional mechanism for resolving governance problems in the United States, but it has not been the only one in play in the current adjustment period. There has also been a very broad array of public, private, and cooperative experiments attempting to upgrade the capabilities of the supply base in the areas of production quality, service provision, and cost reduction. The experiments can be categorized as consortial, associational, and corporate. In each case, public support may or may not play an important role.

The Wisconsin Manufacturers Development Consortium (WMDC) is an example of a public-private consortium of large OEM firms, public agencies such as the Wisconsin Manufacturing Extension Partnership (WMEP) and technical colleges devoted to the improvement of the capacity of local component manufacturers to compete at the levels of production quality and cost reduction capability that the participating manufacturers require (Erickson 2002; Klonsinski 2002; Rickert et al. 2000; Schmitt 2002; Whitford and Zeitlin 2004). Component supplier firms serving the members of the consortium have their participation subsidized by public money and

they gain significant access to OEM know-how through participation in consortia-sponsored courses. A similar programme has been started in Pennsylvania in the United States.

There are two different examples of associational leadership in the provision of service to firms seeking to learn how to square the circle of quality, service, and low cost that is constitutive of sustained contingent collaboration. The first is a programme for supplier training directed by the Industrial Training Program (ITP) in Illinois's Department of Commerce and Community Affairs (Kulek 2002). This programme provides public funds to a variety of Illinois industry associations with membership structures composed primarily of small and medium-sized component manufacturers. In the case of the Valley Industrial Association (VIA) (in the outer western Suburbs of Chicago) (Whalen 2002) or of Norbic (a membership-based industrial development association on the north side of Chicago serving primarily small and medium-sized producers), the ITP awards the associations funds and member firms make specific proposals to the association for training subsidies. Fifty per cent of an individual firm's training expense is paid for by the programme. The Valley Industrial Association encourages members to make use of the funds (which they do in large numbers), but does not give advice or assistance as to the types of training that may be necessary. Norbic provides consulting services to its members to help them optimize the kind of training they utilize and then provides grants to firms for the training (Norbic A and B).

The final variant of governance mechanisms capable of balancing manufacturing quality with continuous cost reduction is a corporate one. Here there are two different kinds of mechanisms: one directed by internal corporate consulting units on operating units that are active as component suppliers; the other directed by OEM firms toward their component suppliers.

The first mechanism can be found among large component and complex subassembly producers such as Emerson Electric, Danaher, GKN, and more specialized component producers such as ITW. These firms operate their own internal organizational consultancies, often through their corporate 'Technology Centers'. Firms such as Danaher are widely known for their uniformly 'lean' production operations and they are able to achieve this across a broad array of operating units and subsidiaries through the use of corporate training programmes for operating unit engineers, managers, and workers (often run through their corporate university) and technical consultants who benchmark subsidiaries within the conglomerate and disseminate information on

successful organizational forms. These corporate institutions broker solutions for independent operating units, bringing knowledge and expertise to a local production level which those local units would not have been able to marshal on their own.³

The second mechanism is in many ways a variant on the now increasingly discontinued practice of supplier development, although here the aim is to provide training to groups of suppliers to enable them to reorganize rather than to directly reorganize individual suppliers. Moreover, in the most prominent case, this corporate policy is undertaken with local government subsidy. The same Illinois ITP programme mentioned in the discussion of associational initiatives above also makes supplier training money available directly to the three largest manufacturing OEMs in Illinois—Caterpillar, John Deere, and the Ford Motor Company. These firms are charged with using the money to train suppliers that they identify as needing production quality assistance and improved cost reduction capability. In these cases, the large OEM designs the curriculum and offers training that it believes will enable suppliers to consistently achieve quality and cost reduction targets that the firm establishes (DeDobbelaere 2002). In effect, the state of Illinois outsources regional industrial policy to the major actors and shapers of industrial practice in the state. The effect, however, is to ensure that small and medium-sized component suppliers cross the initial learning threshold for participation in the new style subcontracting relations.

In sum, the governance of initial learning on the American side is characterized by processes of merger and firm recomposition guided by the market as well as by an array of non-market experiments: associational, consortial, and corporate. Some of the mechanisms that have been set up (in particular the state sponsored corporate programmes in Illinois) have the traditional character of firm-led or arm's length incentive creating industrial policy for which the United States has long been known. But others are more path breaking: the consortial and associational programmes in Wisconsin, Illinois, and Pennsylvania and some of the intra-corporate consulting agencies are interesting because they are deliberative. They involve systematic contact for information and experience exchange among the principle parties

³ The danger, of course, is that these centralized mechanisms undercut the strengths of the local units in their efforts to impose a unitary idea of best practice. For an extensive discussion and critique of this kind of centralized top down benchmarking in the context of multinational companies, see Christensen and Zeitlin (2005), Ch 8–13.

(OEM, Supplier, Association, State agency) in both the conception and execution of policy.

In Germany, efforts to help producers to develop the capability to participate in the new subcontracting arrangements also have been quite varied. Different mechanisms have been in play (market, corporate, and associational) and the use and impact of the different mechanisms has been different in different regions. In some ways, the mechanisms observed are quite consistent with the kind of governance that traditionally has existed in industrial Germany, but in other ways the current experiments mark a clear departure from the path.

One traditional mechanism (often underplayed in discussions of Germany) has been the market. Private consultancies, for example, have been very important vehicles for the diffusion of knowledge about the new production and supply relations in Germany (Jürgens 2003). Mergers have also been very prominent in the component supplier market, again at all levels. In Baden Württemberg alone, the largest region of automobile component production in the country, the number of prominent first tier suppliers to OEMs has been consolidated from somewhere between twenty-five or thirty players to less than ten over the course of the last decade. Plainly, in both the United States and Germany, many firms have found it easier to acquire new capabilities by merging with actors who possess them (particularly in the technology and development area) than they have to develop them from scratch in-house.

There have been other efforts, however, involving the cooperation of state, associational, firm, and educational entities, that resemble the kinds of governance arrangement that is extensively discussed regarding the German case in the varieties of capitalism literature. For example, beginning in the mid-1990s, a series of Länder government 'supplier initiatives' were created in the automobile industry (after strong lobbying by component industry associations) which brought together large automobile firms, their suppliers, and local technical universities into an informational network. For several years, these initiatives sponsored regular events in which details about the new production arrangements and supplier relations were extensively discussed. Stronger and more enthusiastically attended in some regions than others, such initiatives made information available to those suppliers interested in receiving it. In large part, such efforts stopped at the boundary of the supplier firm, but they facilitated consulting business for the local technical university experts among member firms in the Initiative. Finally, the traditional German system of codetermination

has also played an effective role in helping to diffuse the workplace and production arrangements of 'lean production' (in particular team work, continuous improvement procedures, and cellular production) through the issuance of central guidelines for the adoption of the various elements of lean manufacture (Jürgens 1997, 2003; Roth 1997).

Such reactions to the challenge of the new supplier–OEM arrangements constitute a kind of systemic reflex: the German institutional architecture doing what it can to help producers adjust to a new set of conditions. Such reflexes have been significant, but in crucial ways they have not always been enough for producers. The supplier initiatives had very uneven coverage (in many ways their success depended on the interest of the local OEM). Concretely, they facilitated information exchange and created networks for consultants, but this was often either too little information or too expensive (or both) for many firms to benefit from. The industrial relations system had success with problems related to work organization and production flow within firms, but it was crucially inattentive to the elements of the new system that involved inter-firm relations—logistics, services, cooperation in design, and product development. As a result, many German supplier firms felt left in the cold by the traditional institutional architecture. This opened up a space for very interesting experiments in governance that depart quite dramatically from the German norm.

One remarkable experiment of this kind has been taking place in the Bergisches Land in Nordrhein Westfalen. This region is the second largest centre of automobile components production in Germany and the largest concentration of small and medium-sized component producers in that sector. For traditional reasons, public policy for suppliers has been very underdeveloped in the Bergisches Land (Herrigel 1996). Local banks are overwhelmed and cash poor; larger banks are pulling away from the industrial Mittelstand (SMEs); employers' associations are traditionally fractionalized and as a result passive. In this case, the institutions of German coordinated capitalism are truly in disarray.

Somewhat ironically, it has been the local IG Metall union, the strongest extra-firm institution in the region, that has stepped into the breach and begun pushing firms to upgrade and embrace not only newer forms of work and production organization, but new production services and logistics as well. IG Metall's involvement in restructuring takes place in one of two ways (Janitz 2002). First, in a significant array of cases, agents from the trade union district office in Wuppertal act directly as consultants, offering firms advice on how to restructure their product palette, their labour and production

arrangements, and their finances in order to be able to achieve the quality and cost targets demanded by large automobile industry OEMs. Second, and more often, the union acts as an intermediary between the firm and consultants who come in, audit the company and provide advice and consulting on how to restructure the firm to be competitive.

Typically the union becomes involved (in either of the above ways) because it is asked to do so, first by the works council in a troubled firm (either in bankruptcy or in financial trouble) and then by the management itself. The union establishes a set of conditions with the firm on restructuring—that is, they will help with connections and line up consultants as long as the firm agrees to certain parameters (in the interest of IG Metall members) in the restructuring process. With agreement, the union then goes ahead and lines up the consultant. There are a number of very skilled local consultants who have had success in local restructuring. They know the firms, know the regional culture, know the industry, etc. But the union also uses its position to pressure the works council (to the extent it is resistant) to adopt practices in the long-term interest of the competitiveness of the firm (cells, teams, continuous monitoring, benchmarking of best practices in the industry, etc.).

In these ways, IG Metall is playing a pivotal role in the management of small and medium-sized firm adjustment in the region. The union is simultaneously a broker and a conveyor of specialized knowledge. IG Metall mediates consultants who help troubled firms restructure; it establishes guidelines for the general restructuring process with the firm before the consultants are deployed; it engages itself in the internal restructuring discussion and is typically given access to the firms' books. Moreover, due to the structure of the German Federal Works Constitution Act, the union is in a remarkably good position to be able to evaluate the performance of the various actors it engages and sets into action in the restructuring process. Union officials from the local district office sit on the supervisory boards of important megasuppliers (core customers of local SME firms) and hence are privy to very intimate information on the megasupplier's practices and strategies—worldwide. IG Metall knows what the customers of local firms want and is in a position to helpfully convey that information to its clients and critically evaluate management suggestions and the performance of consultants.

It is important to emphasize that this kind of intervention constitutes a dramatic departure from traditional practice for IG Metall. It is improvisation in the context of a failure of the traditional

system to provide for area firms. In one sense, the union's actions have a very traditional interest: to protect jobs in the region by enhancing the competitiveness of the firms that are located there. But in order to achieve this goal the union has had to break from the traditional confines of union activity within the German system. In effect they are constructing a system of 'comanagement' within local firms where the trade union and works council deliberate on strategic questions regarding the firm's future and its customer relations that go well beyond the relatively circumscribed work place and labour market arenas demarcated in the system of codetermination and works constitution statutes in German law. At the same time, they are acting as a regional benchmarking agent, distributing information regarding best practice among area firms and even using information about international best practice that they are able to access through other roles they play in the system of codetermination (i.e. sitting on boards of multinational corporations headquartered in the region).

This example for how the process of initial learning is being organized in Wuppertal is dramatic, but there are myriad other forms of departure and innovation occurring across the German industrial landscape as firms and associations seek to cope with the limits of the existing institutional architecture. As in the United States then, the problem of initial learning in Germany is being confronted in ways that both conform with and depart from the traditional path. Crucially, the departures from path in each case do not converge. Although they perform some of the same services and functions, for example, the Wisconsin supplier consortium and the Wuppertal experiment in Union-led restructuring constitute quite distinct and different institutional efforts to cope with initial learning.

11.3.2.2. *Coping with cost reduction pressures in the United States and Germany*

Cost reduction pressure in the current environment stems from the permanent pressure that producers feel to be technologically innovative. Firms must allocate increasing amounts of resources to research and development—and moreover, in areas that are not always part of the traditional strengths of the business (e.g. plastics or electronics for automobile producers). In order to be able to do this, they must withdraw resources from other areas—hence the trend toward outsourcing and a focus on core competences. But in addition to these measures, the pressure to remain innovative imposes

permanent pressure on in-house operations and on suppliers continually to reduce costs. As we indicated in our discussion of the sustained contingent collaboration relation, a firm's facility in cost reduction is a major competitive advantage for it in dynamically changing relations.

Being able to cope with this continuous pressure is thus a crucial governance issue in manufacturing today (Herrigel 2004). Firms must develop the in-house procedures to be able to continuously generate and identify cost reduction possibilities. The overarching challenge in achieving continuous cost reduction is to create an organization that encourages all actors in the product design, development, and manufacturing processes to reveal to others what they know about their area of preoccupation. Such organizational transparency facilitates the identification of inefficiencies within functions as well as possibilities for improvement in the interfaces between functions. Actors have to abandon the opportunistic impulse to protect information for local advantage and recognize that transparency is in the interest of everyone in the process.

At the level of work and production organization, the core arrangements of lean production (teams, production cells, kaizen practices) make continuous improvement one of their objectives. Typically these arrangements encourage actors to reveal to one another what they know by grouping all relevant functions in the creation and production of a product together in a governance structure that directs its production—hence, the outcome/reward for each function is dependent on the outcome/reward for all the others. All recognize their common stake in the successful delivery and continuous improvement of the product. Such arrangements seem to have diffused quite broadly in both the United States and Germany at this point, though the transformation continues to be incomplete and the emphases in each political economy differ slightly (Jürgens 2003; Streeck and Yamamura 2003: 29).

Cost reduction is also a key component of the search process that all producers in the sustained contingent collaboration relationship engage in. Firms scan the terrain, both through collaborative benchmarking procedures in the product development process and through serial contracting with specialists, not only for technological know-how, but also for organizational innovation and cost reduction expertise. Practices in the United States and Germany are remarkably convergent along this dimension as well.

Both of these layers of cost reduction practice are limited, however, in that they tend to be focused on particular projects or parts

of the production process and as a result lack a sense of the overarching situation of multiple projects and multiple production processes in the enterprise as a whole. But it is precisely at this level that much of the strategic back and forth of cost reduction takes place between firms in sustained contingent collaborations. Consequently, firms have had to develop internal mechanisms which encourage product dedicated teams to reveal to super-ordinate internal scanning actors what they know. This makes it possible for the scanners both to identify cost reduction possibilities throughout the firm (including projects whose profitability can be sacrificed to achieve a customers cost reduction demand in the interest of the extension and development of other very profitable projects) and to help diffuse innovations and practices that product-dedicated teams may be developing. At this level of internal scanning, American and German firms have some similarities, but on the whole they have been developing different sorts of mechanisms.

The similarities can be found in the smallest firms. Here in both countries the super-ordinate monitoring role is frequently assumed by the principle owner of the firm. In both countries, the effectiveness of this role depends very much on the local balance of power: if the owner acts autocratically, based on what she can observe rather than on what is revealed to her by the various product cells, cost reduction is often a battle over givebacks and wages between production workers and management. This kind of arrangement is less successful, in large part because the top down structure of governance does not encourage actors in production to truthfully reveal what they know. If, on the other hand, the owner facilitates exchange between the various parts of his firm and engages in regularized consultation with shop floor personnel—team leaders, project coordinators, etc.—the results are better. Cost reduction is most successful when it becomes a process of collective self-examination across roles and lines of authority in the firm.

An alternative mechanism, found in small firms we visited in both the United States and Germany, involves the creation of actors with roles in the firm that systematically cross functions and stages in the production process. In one small family-owned component producer we interviewed in Germany, for example, the owner described their internal deliberation procedures, in which works councillors and production workers met regularly with management and ownership, was designed to 'systematically produce surprises' about plant layout, machine operation, work organization, material flow, as well as possibilities for new products. The key to the success of this was

the existence of toolmakers and set-up personnel who were allowed (expected) to float back and forth between design engineering and machine operators and across product lines. Similarly, one small US deep draw stamping firm in western Michigan that we interviewed organized cost reduction scanning through the construction of dramatically expansive job descriptions for skilled toolmakers in their shop. These skilled workers shepherded projects from beginning design to end manufacture and met regularly with one another as well as plant management and machine operators to discuss progress. In both the German and US cases, the key to success was that management and work teams both identified their success with the improvement of the product and the cost reduction process. Skilled workers who were intimately involved at all stages of the production process act as key integrating figures between the shop floor and firm management.

In larger firms, however, the formation of a super-ordinate internal scanning practice differs between US and German firms. In the United States, two sorts of scanning practices predominate. One is an autocratic role for finance departments in internal deliberations about cost. Because public US firms are required to make costs more transparent to the outside, finance people are able to use the force of accounting and shareholder value arguments to impose particular decisions on multiple projects. The criterion used is purely financial without consideration for the location strategically of particular projects in the historical relationship between the firm and its customer. In this case, the powerful role of finance departments is very much in line with what one would expect from the institutional structure of the US 'liberal market economy'.

A second mechanism, often conceived of as a counterweight to the force of finance departments, has been to establish ongoing inter- and intra-operating unit cost reduction conversations among the relevant actors in the production process. Such conversations (organized in the form of weekly meetings or teleconferences between project teams—often including key subsuppliers) bring together all those responsible for contracts with particular clients to exchange information and discuss collective possibilities for meeting the client's targets. The parties all have an interest in coming up with something to satisfy the client—each recognizes that future business with the client may depend on it. Such meetings tend both to identify best practice within the firm (through self-reporting), and create a forum in which the generalization of such practice can be discussed.

Rather than by hierarchical direction or financial leverage, such mechanisms turn mutual learning and information exchange to the competitive advantage of the firm as a whole. It is in many cases true that the genesis of these institutionalized conversations has occurred because of the unrelenting internal pressure of finance departments in American corporations: the institutional goal of the cross-project and cross-functional conversations is to achieve (or beat) the goals established by finance, but in ways that are consistent with the health of both internal and customer relations as well as long-term efficiency of production within the enterprise. Regardless of how they are generated, the key to their success is that all stakeholders in the products going to a particular client are represented in the conversation. Needless to say, this kind of mutual monitoring and sharing of information, as a form of governance, marks an interesting departure from the 'liberal market' practices associated with VoC characterizations of the American production system.

In the German case, the institutional form of the super-ordinate scanner is different because the basic institutional contour of the firm is different from that in the United States. Many large firms, for example, do not have the same kind of external pressure from finance markets that embolden (and strengthen) the hand of the finance department in US corporations. Engineering and production departments are far stronger within German corporations than in American ones. But cost reduction pressure is just as intense in Germany, so firms have had to develop alternative mechanisms to identify firm-wide cost reduction possibilities. Three different kinds of experiments in this regard suggest the flavour and range of organizational recomposition that is taking place.

The first, currently being developed at a large first tier automobile supplier resembles in some ways the internal consulting groups in American corporations that have played such an important role in initial learning. This is a cross-functional team charged with what the firm calls *Leistungsorientiertes Management* (Performance Oriented Management) whose charge is to monitor operations across the firm seeking efficiencies and cost reduction possibilities that may be neglected by the structure of team projects, for example, material purchases that could be combined, common design possibilities, complementary machine usage rates, etc. These teams are given general cost reduction targets, but they can only achieve them in consultation with project and production teams. In turn, the production teams, who experience direct pressure from their customers for

specific give back percentages, view the performance-oriented team as a resource.

The second and third mechanisms seek to achieve the kind of continuous conversation among stakeholders described above in the American context. But the conversations are realized via different institutional actors and catalysing agents. The second mechanism being deployed by many German firms is to redraw the role of logistics departments in extremely expansive ways, such that agents from that department concern themselves with all organizational and product development issues within and across projects. Logistics teams engage with all existing product development and production teams, at all stages of the development and production process, in an effort to generate and diffuse continuous cost reduction throughout the product development and production cycle. The logistics departments also concentrate, in conjunction with purchasing, finance, and development departments, on achieving the flexibility to balance varying intensities of cost reduction pressure across all projects within the firm. In these ways, logistics players have their incentives aligned both with the teams associated with specific projects and with the general cost reduction targets associated with the department as a whole within the enterprise.

A third kind of experiment, at once the most remarkably German, but also perhaps the most at odds with the traditional institutional structure of the German production system, involves the systematic involvement of works councils, in collaboration with plant management, to scan for cost reduction potential. In the case of one large supplier to the mechanical engineering industry, in which the IG Metall is very strongly represented (over 90 per cent workforce organization, including management), the works council pursues an extremely expansive version of German comanagement. Instead of confining their activities to the narrow tasks of workplace training, wages, scheduling, and arbitration, this works council contributes detailed proposals for work, production and product design reorganization to plant management (in most cases themselves IG Metall members).

Initially, the works council became involved in the presentation of proposals for reorganization in an effort to present management with alternatives to proposals developed by outside management consultants. With time, however, as it became clear that pressure for cost reduction was unremitting, the works council devoted an increasing share of its resources to the problem (devoting two full-time members

of the works council exclusively to the problem of cost reduction). It has gone so far that the works council has become involved not only in the optimization of organization in the servicing of existing contracts. They have also become actively involved in the way in which the company constructs its bids on new contracts. These activities are in line with the general role of German works councils—to make the employment of its members secure. But it pursues this goal in a very unconventional manner—involving itself with engineering and controlling departments in addition to production level management in an effort to achieve internal efficiencies that allow the firm to meet existing cost reduction targets and to win new contracts.

As in the case of the new style logistics departments (and in some ways, the newly defined boundary spanning toolmakers in the small firm examples), the advantage of the works council in the process is that it is, as an actor, both part of the local level in the plant and involved in super-ordinate scanning. Local players are willing to reveal what they know regarding the strengths and weaknesses of their area because they know that the works council has no incentive to punish them with that information. The result is greater transparency regarding cost throughout the firm.

Many of these German and American examples show that there are clear departures from the traditional path. There are, for example, no constraints or enabling rules in the institutional system in the United States to create cost reduction conversations or boundary-crossing toolmakers; nor are the new style logistics departments or cost reduction oriented works councils enacting a logic prescribed by the German institutional architecture. In all these cases, actors are innovating despite the rules of the game. The institutional arrangements are not so much constraints or enablers as they are resources in the creative process of experimentation.

Nonetheless, although we believe these examples constitute departures from the path, we also believe strongly that they should be viewed as experiments. We do not intend to suggest that the above illustrations constitute the emergence of a new 'system' in either institutional setting. Rather, by outlining an array of experiments, we want to convey the breadth of current experimentation that exists at a local level. We see institutional adaptation through the recomposition of organizational design or the redefinition of roles. Many of the experiments involve departures either from the traditional roles of actors within the institutional architecture of the German and American production systems or from the organizational ecology established by

those architectures. All the experiments draw on existing resources, but apply them in new and creative ways.

11.4. Conclusion

In conclusion, we would like to review and underscore three points about the argument and evidence in this chapter. First, we have argued that the process of vertical disintegration and the emergence of sustained contingent collaboration is a global trend. It is occurring in similar ways across different political economies. But unlike neoliberal arguments, ours is not a claim about the diffusion of a single standard of efficiency throughout the global economy. We are not making a 'one best way' argument about institutional convergence. Instead, our argument, embodied in the characterization of OEM purchasing behaviour in Section 11.1 and the typology we develop in Section 11.2, is that there is great heterogeneity of practice in the current global manufacturing environment. OEMs pursue a wide array of practices and strategies even as their commitments to vertical disintegration intensifies. In our view, sustained contingent collaboration as a type of relation between OEM and supplier is emerging across advanced industrial societies as the modal relation, but it remains only one possibility among several others. Finally, we show that even our modal relation, sustained contingent collaboration, is emerging under a broad array of different governance mechanisms in both Germany and the United States. Vertical disintegration and the emergence of sustained contingent collaborations are global trends. But this is not evidence in support of neoliberal claims regarding the economic processes of globalization.

Second, this chapter has been an extended reflection on the limits of contemporary institutional analysis, particularly that of the Varieties of Capitalism School, in accounting for the differences that continue to exist in developed political economies. In insisting on the difference between our argument and the strong convergence claims of contemporary neoliberalism, we are in agreement with much institutionalist writing on the persistence of differences across advanced political economies in the context of contemporary trends. But, in our view, contemporary institutionalism of the VoC variety goes too far in its emphasis on comparative institutional advantage and the path dependent character of systemic change. In a way that is inconsistent with the VoC characterization of the national institutional advantages

in the United States and Germany, we have shown that sustained contingent collaborations are emerging in both societies. Germany does not have a greater preponderance of, nor display, any particular advantage in cooperative practices. US firms are neither more invested in arm's length contracting, nor more capable of radical organizational recomposition than their German counterparts. Instead, conflict and cooperation and institutional recomposition and experimentation characterize actors' strategies in both societies.

Similarly, regarding institutionalist claims about path dependence, our evidence shows that with the diffusion of sustained contingent collaboration, actors' efforts to cope with pressures for adjustment are producing a variety of significant departures from the path of action generally thought to be encouraged by either the US or German institutional architectures. The cooperative deliberation within large US firms regarding cost reduction and the collaborative supplier training consortia in the US and Union led restructuring and works council-driven cost reduction in Germany all are significant departures from the path. In some cases, actors are guided by traditional conceptions of their institutional roles, yet find it to be necessary to act in unconventional ways to be able to realize those goals (e.g. the IG Metall in Wuppertal or works councils engaging in systematic scanning for cost reduction). But in other cases, actors respond to challenges posed by the competitive environment in ways that appear to be neither systematically constrained nor encouraged by the institutional architecture in which they are embedded. That is, actors respond creatively to their situation (e.g. the expansive role for logistics departments in Germany or the expansive cross-functional role of toolmakers within US and German small firms).

All of this evidence, in our view, underscores the reflexive character of action within a social economy. Actors are not confined within a rigid institutional system of constraints and incentives, but instead exist within a social system of contingently coupled dispositions and habits (Bourdieu 1977; Dewey 2002). They solve problems through collective self-reflection and experimentation, using and recomposing the resources (institutional and otherwise) that they have on hand. The result, as we have shown, is not only that actors appear at times to be oblivious to the constraints or incentives provided by their institutional surround. They also recreate institutional difference across political economies as actors creatively recompose and even break from the framework for practice that their institutional context provides.

The third and final point we would like to underscore here concerns the experimental and ultimately piecemeal character of change in both the German and US political economies. None of the examples of institutional innovation and recomposition outlined in the second half of the chapter in the areas of initial learning and cost reduction constitutes a dominant form of adjustment within either the United States or Germany. Adjustment in both societies is extremely fractured and driven by local experimentation. It is not for this reason to be taken less seriously. Instead, we believe that the transformation of institutional architectures within contemporary advanced political economies is occurring in precisely this sort of decentralized, local, and piecemeal fashion. Giants are felled by thousands of arrows.

The current character of global competition, characterized as it is by virtually permanent technological change and organizational uncertainty, leads to the following boundedly general consideration. Much of the literature on institutional systems, not least the VoC tradition, discusses the historical development of institutional architectures in the imagery of periods of stability marked by dramatic junctures of upheaval and change followed again by a period of stability. One can be critical of this historical imagery as a general matter (Sabel and Zeitlin 1997), but it seems particularly inappropriate to impose narrative expectations of a coming period of institutional stability (equilibrium) on the current situation. In large part this is because what stands out about the experiments that one observes today is their self-consciously provisional character. They have been brought into being because actors perceive common problems that are not being addressed by the traditional institutional instruments available to them for the purpose of addressing such problems. Actors are not willing to describe what they are doing as a new order because they are too acutely aware of the possibility that they will have to change again in the current turbulent environment. The distinctiveness of current problems is that they are never definitively resolved: Innovation and Cost reduction, and the institutional tinkering and recomposition that they entail are continuous processes. Old institutional rules today are not only being broken, but new ones are continually being defined and then redefined.

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