PRAGMATIC COLLABORATIONS IN PRACTICE: A RESPONSE TO HERRIGEL AND WHITFORD AND ZEITLIN

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In incisive and well-informed papers Herrigel and Whitford and Zeitlin defend the pragmatic collaborations/learning-by-monitoring (PC or LBM) view of customer–supplier relations against rival interpretations, but point to defects in the argument that may be related to fundamental limitations in the whole approach. Herrigel argues that whereas LBM suggests that customer–supplier relations will converge on a single type of collaboration, the evidence is that there are, and will continue to be many variations. It is by choosing from among these types, and combining them in new hybrids, that customers and suppliers respond to and perpetuate problems of imperfect information and power disparities obscured by the LBM approach. In a similar vein Whitford and Zeitlin argue that coordination problems, of which power struggles are again part cause and part effect, will block a transition to LBM collaboration unless moderated by supra-firm governance mechanisms that reduce the chances of misunderstanding and intentional abuse. Read together, the two papers, and especially Herrigel's, suggest that LBM may be academically useful insofar as imperial theories (one theory for each epoch, if not for the ages) can be, but also that it would be suicidal for the actors (and actor-oriented theory) to take the ideas too seriously. Since LBM is, among other things, an effort to generalize from the actors' cooperative response to a world too volatile for traditional hierarchies and markets, this is disquieting.

I respect the authors too much, and have myself seen too much of what they see to challenge their findings. In responding therefore I will try to reinterpret those findings in a way that illuminates them while developing the idea of LBM. I will argue that the diversity of customer–supplier relations results from alternative interpretations of how, under ambiguous conditions, to build the process of iterated co-design at the heart of PC, and that the ambiguity fueling the diversity is rooted in the nature of iterated co-design itself (although it may be exacerbated by other factors, starting with power disparities). Giving a parsimonious account of such variations on a theme is just what we should expect a practice-oriented theory to do.[1] With respect to

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1 Bourdieu illustrates the shortcomings of theories that abstract from practice with a parable about a structuralist anthropologist who adopts a child from a distant culture. The anthropologist, being a structuralist, thinks the child will be sufficiently instructed in her culture of birth if she is taught its master rule: give like for like. Returning to her birthplace years later, the girl meets her uncle, who welcomes her with a gift. Following the rule as she learned it, the girl hands the present back to the uncle—who roars that she is an ingrate. The aim of his *Outline of a Theory of Practice* (1977) is to demonstrate how an account of a rule that anticipates its revision through the differing local interpretations of its meaning is both theoretically more satisfactory—better able to account for the actors' actions—and more useful practically—a better guide to actors seeking pointers on how to act—than the "structuralist" generalization.

governance I will argue that the design and provision of supra-firm coordination mechanisms—a kind of public good—requires a kind of second-order application of LBM principles: just as the actors are learning to co-design products, they have to learn how to co-design the institutions that make this first-order cooperation more robust. Again, the theme is variations on a theme. Power disparities play a role here too; but only some (LBM) methods of limiting these disparities address the current problems of governance.

Take first diversity of customer–supplier relations. Herrigel returns the discussion to what we agree is the right starting point: the distinction between views (like LBM/ PC) that see vertical disintegration and the reorganization of production generally as re-integrating conception and execution, and views (like the Sturgeon–Florida notion of supply chains) that see a tendency to further separate them. The latter suggests a world of "vertically integrated mega-suppliers . . . and manufacturers of standardized goods competing primarily on the basis of price and low labor cost advantage (located, ultimately, in low labor cost regions)". The former suggests a world populated by "competitive and sophisticated small and medium-sized component producers in high labor cost regions". On balance Herrigel sees a drift in the direction of the re-integration of conception and execution. But this doesn't decide the "hard choice" between mega-supplier and competitive small firms. In reality suppliers have to deal with customers who need to engage in co-design with some—but only some, and not always the same—actors all the time, while dealing traditionally—at arm's length— with the rest. Whatever constancy the customers' strategies may have is not apparent in transaction with *them*, so suppliers hedge their own behavior to survive arm's length as well as (different kinds) of cooperation. Their responses in turn permit, and may encourage, continuation of the customers' strategic vacillations. "Hybridity", not uniformity is the outcome.

This argument does reveal a flaw in the *Pragmatic Collaborations* paper (Helper *et al.* 2000), but I don't think it is the flaw Herrigel has in mind. That paper, so far as I can tell, does not actually map the key notion of iterated co-design to the fine-grained organization of supply changes. Insofar as it contains clues for such a mapping, the suggestion I suppose is that the co-design relation scales: the lead team uses a benchmarking comparison of actual and potential design alternatives to establish a provisional definition of the product. This design is then decomposed into large subsystems or modules. Responsibility for realizing or improving on the initial specifications is delegated to specialized module makers, who benchmark within their own areas of specialization, parse the results, and establish collaborative relations with the makers of subassemblies or components on the model of their own relation to the top-level design team. The result would still be uniformity, although it would be uniformity of internal processes (benchmarking, decomposition, iteration), and hence a nuance away from the uniformity of actual firm structure (competitive SMEs) emphasized in Herrigel's account.

But this rushed reprise of the *Pragmatic Collaborations* story does reveal a fallacious imprecision—not to say a flaw—in the earlier formulation that is cast into stark relief by Herrigel's juxtaposition of theories predicting the re-integration as against the exacerbation of the separation of conception and execution. The flaw is just that modularity *strictu sensu* has no place in the PC story about the explosion

of integrated co-design as part and parcel of the breakdown of separation of conception and execution. Where modularization is possible, in fact, design iteration is unnecessary and even disruptive. Modules are defined, as Herrigel reminds us, by a one-to-one mapping between a function and the physical devices that embody it. Such a mapping in turn depends on the definition of a stable interface—an input/output table—which lists what output the module will return in response to all the inputs entered into it. Once this interface and the corresponding physical structure are defined, design can proceed on both sides of the interface without further collaboration. The effect is to increase, not reduce, the separation of conception from execution in just the way the mega-supplier argument captures.

So what is talk of modularization doing in the middle of a PC account? The short answer is creating unnecessary confusion. The focus of that paper was the "routinization" of routine-disrupting routines: benchmarking and simultaneous engineering and design, and just-in-time and the five whys in production. The diffusion of iterated co-design was a principal conclusion, references to overall supply chain structure almost an afterthought, and a careless one at that. If Helper, MacDuffie and I had been more attentive to this issue we might have had the presence of mind to note that we used modularity as a kind of shorthand for the provisional parsing of complex wholes into parts whose subsequent development would then suggest modifications of the initial overall design, which would be provisionally parsed again, and so on. In recent writing I commandeer the term chunking from cognitive science to name this routinely corrigible and hence non-modular grouping of tasks.

With this clarification in mind, let me take a second try at a back-of-the-envelope mapping of iterative co-design to a supply chain structure (or supply chain process, given the impossibility of defining fixed positions of the kind associated with structures). Since modularization is by definition impossible, we cannot have the Russian-doll structure of very big module makers containing big module makers, containing smaller ones down the line. Instead of looking as it were from the top down at the structure that results from the cascade of modularization, we look from the bottom up at the successive layers or types of activity that have to be on call for iterative co-design. At the bottom will be specialized production processes on call to the makers of specialized components for one or more industries or product areas. The specialist component makers will be on call to system makers, again from one or more product areas; and the system makers will be on call to one or more final customers. Of course process specialists will try to group different complementary or alternative processes to be as attractive as possible to component makers without assuming crushing debt-service burdens. Component makers will try and assemble portfolios of related or diversified products that maximize their attractiveness to the greatest possible variety of systems makers without risky financial exposure. Systems makers will try to come as close to providing modules as possible without bumping into the boundary revisions intrinsic to iterative co-design.

Because of the openness of the design process—remember that it is designed to unsettle its own expectations through benchmarking—it is unlikely that strategic choices will result in an equilibrium. The most stable positions in the whole process would probably be those of the specialized component makers because they can hedge their bets both upstream and down. They can switch from one production

process to another as innovation demands, so they are less exposed than the process specialists to the risk that a key technology becomes un-competitive. On the other side, they can diversify across customers and industries more easily than systems makers simply because components are ingredient in many systems while large systems are ingredient in only a few products.

Rushed and sketchy as this map is, it nonetheless matches up surprisingly well with Herrigel's own chart of the supplier types. In his account the mega-module makers, having invested in the capacity to produce relatively fixed systems, are constantly wrong-footed by the fluidity of actual designs. Federal Mogul is in bankruptcy, while Dana and Tenneco teeter on the brink. The process specialists survive, when they do, largely on the ability of family management to bundle production technologies in a way that maximizes the firm's ability to increase its design capacity while holding the incremental financial risk to a minimum. The real winners are the diversified component makers such as Emerson Electric and the Illinois Tool Works (ITW). ITW, recall, is essentially a federation of small component makers sharing research and development facilities and a governance structure that ensures each unit's dedication to innovation in its own component area. Herrigel treats it as a hybrid—a mixture of small and large firm, and firm and industrial district[2]—beyond the ken of the debate as he stylized it, whereas the firm's features emerge directly, as a canonical winning strategy, from mapping iterated co-design to supply chain structure/process. Herrigel's last category, the low-cost, arm's length producers, has a place in this picture as well. Much of the activity of this type results from suppliers' efforts to recover, by renting out machines under job-shop conditions, at least some of the cost of equipment purchased in pursuit of some specialized process or product strategy involving or aiming at co-design.

Note that this iterated co-design characterization of supplier strategies converges with the typology presented in Whitford and Zeitlin. For them the core, "sustainable" supplier strategies are process and product specialization, in the most favorable case hedged by what they call the horizontal diversification of customers and the vertical diversification of processes. They are skeptical of the mega-supplier strategy for the reasons discussed above; they treat the low-cost or underbidding strategy as a (very risky) route to one of the others.

In saying that the core of the supply behavior that Herrigel observes can be explained by the ambiguities of iterative design itself, I don't mean to be saying that the supply chain is stable or that the instability is not exacerbated by the power disparities and project-by-project portfolio considerations he notes. I just want to caution against invoking such considerations as root causes when they are, on the analysis just presented, complicating factors that make the coordination problems inherent in iterated co-design that much harder to solve. On this point, misunderstandings resulting from the sloppy use of modularity in *Pragmatic Collaborations* aside, I doubt that Herrigel disagrees. In his paper in fact he generally discusses power issues in the context of broader strategic uncertainty. The exception is his emphasis

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2   To which list Herrigel of all people would be entitled to add: firm and *Spezialisierungskartell* (specialization cartel). As developed particularly in the German machine-tool industry, a *Spezialisierungskartell* is an association of firms whose members agree to compete within product areas of their original choosing, and not invade neighboring specialties. See Herrigel (1996).

on the independent role of power disparities in connection with the problem of overcapacity in the auto industry and other durable goods manufacturing sectors. I think the remarks are off the main line of his argument—they concern the industry as a whole rather than relation between customers and suppliers—and I want to say a word about them, if only to suggest that I am not the only one who can be careless in this debate.

Herrigel's argument is that in conditions of overcapacity powerful OEMs are easily tempted to shift costs to less powerful suppliers, pushing the latter over the brink and ultimately harming the industry as a whole. This is not fanciful. It has happened in the USA before: in the 1950s and 1960s the OEMs increased internal capacity before booms out of fear that suppliers would not be able to meet increased demand during upturns. When boom turned to bust, they used the overhang of internal capacity to bully suppliers into reducing prices. Many of those who complied went out of business, increasing the need for OEM's to build up internal capacity before the next boom, and setting the stage for more bullying and a further shake out. In the end many suppliers deliberately produced shoddy parts whose failure generated an aftermarket that supported them when their direct customers would not. Though it would surely play out in a different way, such collective suicide is possible again, and the weakest—the suppliers—would be the first to go.

Collective suicide is always serious business, but in this case it seems more related to familiar problems of collective action than to power imbalances. By power imbalances, or *structural* power imbalances, we generally mean situations in which the powerful can exploit the weak, and go on doing so—not situations where exploitation of the weak undermines the basis of exploitation (and everything else besides). We think of collective suicide resulting unintentionally from discrete, self-interested moves as characteristic of prisoner's dilemmas, tragedies of the commons, and other such perversities of collective action. Overcapacity and its sequelia look to be an instance of these latter, if only because overcapacity is the result of collectively irrational moves by highly rational, very (and equally) powerful players. I know of course that overcapacity and like problems can be seen as expressions of special kinds of collective action problems rooted in the dynamics of world capitalism or (not quite the same thing) in the breakdown of very high-level governance arrangements such as embedded liberalism (which subordinated markets to social concerns). For now the point is not to deny the severity or pertinence of the overcapacity problem—pragmatic collaboration in the US auto industry will not flourish without the industry—but rather to avoid confusion about its character and limits, and therefore possible remedies. Thus it is far from self-evident that addressing the problems of strategic uncertainty inherent in iterative co-design will automatically address the problem of overcapacity, whatever its ultimate origins, and vice versa.

This brings me, finally, to the problems of governance raised in the paper by Whitford and Zeitlin. In reinterpreting the sources of instability in customer–supplier relations I am of course accepting their central point that these relations are not self-stabilizing and therefore in need of second-order stabilization through governance. Whitford and Zeitlin cite an earlier paper of mine on the disconnect between team-based production and both shareholder and bank governance which makes a related point. Helper, MacDuffie and I discuss the general problem, and some possible

solutions. Still, in presenting the way learning by monitoring reduces the risks to collaborators of exploitation by their transaction partners, we may inadvertently create the impression that the higher order problems will somehow disappear if the lower order dealings have the time to work their magic. This is just wrong, and the Whitford and Zeitlin paper is an excellent guide to the current discussion of governance issues in the new customer-supplier relations.

As a pointer for possible subsequent discussion let me add to what they say only a remark on the process by which new governance systems for customer-supplier relations, and much else, are being generated. In a full discussion of this theme I would try to specify the ways in which governance systems are, and are not, like classic public goods. For now I will simply refer to broad changes underway in the governance—and the determination of governance systems—in the Italian industrial districts. References to changes in district governance are pertinent because district experience in general, and their rich history of devising mechanisms for regulating customer-supplier relations, are a key part of the background to the work of Herrigel and Whitford and Zeitlin, as well as my own.

How, then, is provision of infrastructure, including governance, changing in the classic districts? Until roughly the early 1990s there was an "obvious" need for a mixture of specialized and standard "real" services: quality assurance, technology scanning, payroll, accounting, and other functions required by firms that were too small to serve themselves. It was equally obvious which regional institutions and sectoral associations (the CNA, Confartiginato) were "naturally" positioned to provide them.

Since then neither the needs nor the relevant actors have been anything like self-evident. On the contrary: many of the older generation of institutions have been closed, and disagreements over possible successors have hampered the development of new ones. Indeed the process for deciding how to choose new infrastructures has become a matter of intense local debate, with different regions and districts choosing different procedures.

These changes are not peculiar to the districts. In Italy, in many other member states of the European Union, at the EU level itself, and in the USA, more and more public administration is becoming processual. At first glance it seems counterintuitive that the public can be sure of the need for collective goods, yet have only the thinnest of substantive ideas of what those goods should be. But consider the analogy to developments already touched upon in firms. Just as firms benchmark and do root-cause analysis to find designs and errors they did not know they were looking for, so supply chains, districts, and public administration in general are creating processes to define public goods that cannot be specified with any precision before some combination of public and private actors undertakes to provide them.

Given the inherent, strategic uncertainty of pragmatic collaboration, aggravated by coordination problems stretching from the local to the global, the governance of supply chains is surely high on the agenda of practical and theoretical concern. Looking closely at the processual provision of new governance infrastructure is then a natural starting place for a new round of enquiry.

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