

*Rough draft: please do not cite without author's permission*

## Collaboration, Innovation, and Contract Design<sup>1</sup>

Matthew C. Jennejohn<sup>2</sup>

25 January 2008

---

<sup>1</sup> This article is available as Columbia Law and Economics Working Paper #319 (available at <http://ssrn.com/abstract=1014420>) and is a more detailed discussion of a number of issues presented in an earlier working paper, posted at the Columbia University Center for Contract and Economic Organization, entitled *Governing Innovative Collaboration: A New Theory of Contract*, available at [http://www2.law.columbia.edu/contracteconomics/papers/Jennejohn/GoverningInnovativeCollaboration-MattJennejohn-draft2\(7\).pdf](http://www2.law.columbia.edu/contracteconomics/papers/Jennejohn/GoverningInnovativeCollaboration-MattJennejohn-draft2(7).pdf). Many thanks to: 1, Bob Scott, Chuck Sabel, Josh Whitford, Dick Langlois, Ethan Leib, and Phil Scarborough for their insightful comments on earlier drafts; 2, Jeff Gordon, Anders Granberg, Boy Luethje, Katharina Pistor, Curtis Milhaupt, Waltraud Schelkle, and Ronald Coase for direction to helpful materials; and 3, David Zarfes, James Webber, Jason McInnes, Dan Hughes, David Gee, and Doug Durrant for their professional perspectives on inter-firm collaboration in their respective industries. Any errors are my own.

<sup>2</sup> Associate, Shearman & Sterling, LLP; JD, Columbia University School of Law, 2007; MSc, London School of Economics, 2004; BA with Honors, Brigham Young University, 2002. The author, who welcomes comments, can be contacted via [matthew.jennejohn@columbia.edu](mailto:matthew.jennejohn@columbia.edu).

## Abstract:

The rise of the network as a form of economic organization renders problematic our standard understanding of how capitalism is governed. As the governance of production shifts from vertical integration to horizontal contract, a puzzle arises: how do contracts, presumed to be susceptible to hold-up problems due to incompleteness, control production arrangements that by their nature invite opportunism? Relying on publicly-available contracts taken from a number of industries, I argue that firms govern their collaborations through a number of new contract mechanisms, the summation of which is a novel governance system. Because traditional theories of contractual control struggle to fully explain this new behavior, I re-conceptualize contracting as an effort, *inter alia*, to establish a pragmatic learning process between collaborators. Such a learning process must be formally instituted among parties because of the unique, endogenous, and pervasive uncertainty that characterizes bilateral experimentation. Thus, to standard accounts of incomplete contracting, this article provides an alternative (but complementary) explanation of how contract governs inter-firm networks, not by downplaying the importance of hold-ups or by inflating the role of relational norms but by explicating a new positive theory of contract design.

Table of Contents:

- 1. Introduction..... 4
- 2. The “Deverticalized” Economy ..... 8
  - 2.1 Three Hallmarks of the New Economy ..... 8
  - 2.2 Case Study: Apple Computer and SCI Systems ..... 10
- 3. Incomplete Contracting Theory ..... 11
  - 3.1 Theoretical Background..... 12
  - 3.2 Property Rights Theory..... 13
  - 3.3 Self-enforcing Agreements..... 16
  - 3.4 Baker, Gibbons, and Murphy’s Hybrid Theory ..... 20
  - 3.5 Agency Theory..... 22
- 4. A Theory of Generative Contracting ..... 25
  - 4.1 Pragmatic coordination ..... 25
    - 4.1.1 Simultaneous Engineering. .... 26
    - 4.1.2 Benchmarking ..... 27
    - 4.1.3 Error Detection and Correction..... 28
  - 4.2 The Contracting of Pragmatic Governance..... 29
    - 4.2.1 The Stylized Facts of Pragmatic Governance Contracting with Examples from Several Industries..... 30
    - 4.2.2 Case Study: The Boeing and Spirit Aerosystems Agreement ..... 33
    - 4.2.3 The Broader Picture: A Preliminary Analysis of Pragmatic Governance Contracts across Various Industries..... 37
  - 4.3 Re-conceptualizing Contract Design ..... 42
    - 4.3.1 Revisiting Agency Theory ..... 42
    - 4.3.2 A New Theory of Contract Design: Generative Contracting..... 43
      - 4.3.2.1 The Limits of Current Explanations in the Face of Uncertainty..... 44
      - 4.3.2.2 Endogenous Uncertainty and the Role of Learning in Contract Design. 45
        - a. Contract as Modular Learning System. .... 49
        - b. Generative Contracting and Interest Alignment ..... 54
        - c. Contract as Constitution? ..... 56
- 5. Conclusion ..... 57
  - 5.1 Summary in Perspective ..... 57
  - 5.2 Ramifications of the article..... 58
    - 5.2.1 Contract enforcement..... 58
    - 5.2.2 The Theory of the Firm..... 59
    - 5.2.3 Contract and Development ..... 60

## 1. Introduction

How is production governed in a capitalist economy? For most of the 20<sup>th</sup> century, control over production occurred predominantly through ownership: i.e. the various elements of the production process were integrated under the authority of a monolithic firm. Beginning in the late 1970s, however, a general trend away from the vertical integration of production has emerged.<sup>3</sup> This “deverticalization,”<sup>4</sup> often described as “outsourcing,” is not simply a return to governance through arm’s-length market relationships. Rather, deverticalized firms enmesh themselves in webs of collaboration—joint ventures, strategic alliances, just-in-time (JIT) production arrangements, etc.—usually in hope of cost-cutting but also with an eye to securing competitive advantage through innovation. Thus, we have an economy made of not only markets and firms but also networks.<sup>5</sup>

Where property rights no longer control, contracts substitute.<sup>6</sup> I.e. in light of these developments, contract’s place as one of capitalism’s fundamental building-blocks takes on even greater importance. However, if contract bears the burden of governing the network economy, a difficult theoretical question arises: how *can* contract govern such collaborations? The classic transaction cost explanation for the boundaries of the firm has been that production is governed through ownership when firm-specific investments introduce the specter of hold-up problems.<sup>7</sup> I.e. governance through contract is not used where the risk of opportunism is high. However, networked production seems to invite hold-ups: as firms become more interdependent, the opportunities for extortion increase. It is as if, General Motors, facing Fisher Body’s hold-up threat, not only decided against acquiring Fisher (which would have eliminated the hold-up) but also gave Fisher even

<sup>3</sup> For a discussion of this trend in the context of broader economic history, see MICHAEL PIRE & CHARLES SABEL, *THE SECOND INDUSTRIAL DIVIDE: POSSIBILITIES FOR PROSPERITY* (1984).

<sup>4</sup> “Deverticalization” is one of many unwieldy terms (such as “de-integration,” “disintegration,” or “horizontalization”) that scholars have employed to describe the trend. The basic idea, whatever term is used, is that firms are not only spinning-off production units but, in turn, building closer connections with their suppliers.

<sup>5</sup> Walter Powell, *Neither Market nor Hierarchy: Network Forms of Organization*, 12 *RESEARCH IN ORGANIZATIONAL BEHAVIOR* 295 (1990).

<sup>6</sup> This dichotomy is of course reflected in Williamson’s basic differentiation between market and hierarchy. See generally OLIVER WILLIAMSON, *MARKETS AND HIERARCHIES: ANALYSIS AND ANTITRUST IMPLICATIONS* (1975).

<sup>7</sup> See Powell, *supra* note 5, at 296-97 (“The core of Williamson’s argument is that transactions that involve uncertainty about their outcome, that recur frequently and require substantial “transaction-specific investments”—of money, time or energy that cannot be easily transferred—are more likely to take place within hierarchically organized firms. Exchanges that are straightforward, non-repetitive and require no transaction-specific investments will take place across a market interface. Hence, transactions are moved out of markets into hierarchies as knowledge specific to the transaction (asset specificity) builds up. When this occurs, the inefficiencies of bureaucratic organization will be preferred to the relatively greater costs of market transactions. There are two reasons for this: (1) bounded rationality—the inability of economic actors to write contracts that cover all possible contingencies; when transactions are internalized, there is little need to anticipate such contingencies since they can be handled within the firm’s ‘governance structure’; and (2) “opportunism”—the rational pursuit by economic actors of their own advantage, with every means at their disposal, including guile and deceit; opportunism is mitigated by authority relations and by the stronger identification that parties presumably have when they are joined under a common roof.”) (internal citations omitted).

more control over GM production.<sup>8</sup> In other words, we see just the opposite of what transaction cost economics predicts: the economy is relying more and more on contract in situations which blatantly invite opportunism. How can contract govern a situation for which it is so ill-suited?<sup>9</sup>

The academic response to this question has been wide-ranging. One approach, rooted primarily within the finance and economics literature, is to focus on how finessing three types of contract mechanisms—explicit control rights delimited in a contract, the implicit control allocated through property rights, or the effect of reputational considerations where games repeat—can harness opportunism despite the greater potential for hold-ups.<sup>10</sup> Another approach, anchored by a long-running disagreement between Ronald Coase and Benjamin Klein,<sup>11</sup> argues for a return to fundamentals and, thus, questions whether hold-up is even important in determining the boundaries of the firm.<sup>12</sup> If the hold-up problem is illusory, then contract's ability to govern collaboration is not so mystifying. (Of course, this argument takes us back to Coase's original question: if the hold-up problem is overstated, then why not govern production *entirely* via contract—i.e. why firms?)<sup>13</sup> Within this cadre of theorists questioning asset specificity's role in determining firm boundaries, Charles Sabel and colleagues advocate

---

<sup>8</sup> For the conventional story, see Benjamin Klein, *Why Hold-ups Occur: The Self-Enforcing Range of Contractual Relationships*, 34 *ECONOMIC INQUIRY* 444, 445-6 (1996) [hereinafter Klein, *Why Hold-ups Occur*]. Note: the original 1919 contract between Fisher Body and General Motors is on file with the author and available upon request.

<sup>9</sup> See also David Robinson & Toby Stuart, *Just How Incomplete Are Incomplete Contracts? Evidence from Biotech Strategic Alliances*, working paper University of Chicago at 1 (2000) (on file with the author) (“[C]ollaborative arrangements between distinct organizations are a popular and important method of organizing investment in this sector. This in spite of the fact that these deals appear ripe with opportunities to exploit serendipitous discoveries, mis-allocate resources, and otherwise violate the spirit, if not the letter, of an alliance agreement.”).

<sup>10</sup> *Id.* at 2.

<sup>11</sup> See Benjamin Klein, Robert Crawford & Armen A. Alchian, *Vertical Integration, Appropriable Rents, and the Competitive Contracting Process*, 21 *J. OF LAW AND ECONOMICS* 297 (1978); see also Benjamin Klein, *Vertical Integration as Organizational Ownership: The Fisher Body–General Motors Relationship Revisited*, in *THE NATURE OF THE FIRM: ORIGINS, EVOLUTION AND DEVELOPMENT* 213 (Oliver Williamson & Sydney Winter, eds. 1991); Benjamin Klein, *Hold-up Problem*, in *THE NEW PALGRAVE DICTIONARY OF ECONOMICS AND LAW*, 241–244 (Peter K. Newman, ed. 1998); Benjamin Klein, *Fisher-General Motors and the Nature of the Firm*, 43 *J. OF LAW AND ECONOMICS* 105 (2000). Cf. Ronald Coase, *The Nature of the Firm: Origin, Meaning, and Influence*, in *THE NATURE OF THE FIRM, ORIGINS, EVOLUTION AND DEVELOPMENT* 34-74 (Oliver Williamson & Sydney Winter, eds. 1991); Ronald Coase, *The Acquisition of Fisher Body by General Motors*, 43 *J. OF LAW AND ECONOMICS* 15 (2000); Ronald Coase, *The Conduct of Economics: The Example of Fisher Body and General Motors*, 15 *J. OF ECONOMICS AND MANAGEMENT STRATEGY* 255 (2006).

<sup>12</sup> See Yoshiro Miwa & Mark Ramseyer, *Rethinking Relationship-Specific Investments: Subcontracting in the Japanese Automobile Industry*, 98 *MICH. L. REV.* 2636 (2000); Robert Freeland, *Creating Holdup Through Vertical Integration: Fisher Body Revisited*, 43 *J. OF LAW AND ECONOMICS* 33 (2000); Ramon Casadesus-Masanell & Daniel Spulber, *The Fable of Fisher Body*, 43 *J. OF LAW AND ECONOMICS* 67 (2000); Susan Helper, John P. MacDuffie & Charles Sabel, *Pragmatic Collaborations: Advancing Knowledge While Controlling Opportunism*, 9 *INDUSTRIAL AND CORPORATE CHANGE* 443 (2000) [hereinafter Helper et al., *Pragmatic Collaborations*]; see generally, Bengt Holmström & John Roberts, *The Boundaries of the Firm Revisited*, 12 *J. OF ECONOMIC PERSPECTIVES* 73 (1998).

<sup>13</sup> Ronald Coase first broached this question in his seminal 1937 article when asking why firms were used to govern production. Ronald Coase, *The Nature of the Firm*, 16 *ECONOMICA* 386 (1937).

one of the most provocative alternative theories.<sup>14</sup> They acknowledge that hold-up problems are possible but argue that the very nature of these collaborations undermines the conditions that lead to hold-ups. Their theory in brief: explicit contractual rights, ownership's implicit influence, and reputation effects are not necessary to control defection because close collaboration, which makes information mutually transparent, largely eliminates opportunism.<sup>15</sup> Production is "ungoverned."<sup>16</sup>

I argue for a third route which encompasses both approaches. First, I argue that contracts taken from a variety of industries vindicate Sabel's theory of the organization of collaborative production.<sup>17</sup> Strikingly similar agreements, mined from publicly-available SEC-filings, all use the same constellation of contract mechanisms to establish innovation-directed disciplines between collaborators. One of the key characteristics of these mechanisms is that they govern not through top-down command-and-control methods typical to principal-agent approaches but through peer-review systems of unilateral decisionmaking coupled with open information sharing. These contracts create frameworks for learning, not bureaucracies. However, while these contracts corroborate Sabel's theory, they raise a puzzle: if collaboration itself controls opportunism as Sabel argues, then why do these parties use contracts in the first place? Why is this joint learning process not simply used as, say, a management technique? Why is it actually included in the formal contract? In other words, these agreements bring the Coase-Klein debate into sharp focus: what is the function of a contract if not to directly address the hold-up problem? Thus, my second argument is that these contracts can only be fully understood as attempts to institutionalize a joint learning process, not as responses to hold-ups or other traditional externalities. While making this claim requires that I argue that outstanding theories of contract design do not fully explain the contracting behavior observed, it is important to note that, as a theory of how contract mechanisms shape parties' behavior, my alternative shares with the finance and economics literature a common paradigm. My theory can be summarized as follows: fundamental and resilient uncertainty is inherent in collaborative production. Striving for innovation produces this uncertainty, and innovating jointly across firm boundaries exacerbates it. Facing such

---

<sup>14</sup> See primarily Helper et al., *Pragmatic Collaborations* at 443; see originally Charles Sabel, *Learning by Monitoring: The Institutions of Economic Development*, in HANDBOOK OF ECONOMIC SOCIOLOGY, 137-65 (Neil Smelser & Richard Swedberg eds. 1994).

<sup>15</sup> Helper et al., *Pragmatic Collaborations* at 445-6 ("The non-standard firm uses a number of pragmatic mechanisms to create and maintain the conditions under which two or more firms can sustain collaboration. These mechanisms, including benchmarking, simultaneous engineering and systems of error detection and correction (as described below), help overcome both the problems of bounded rationality and of opportunism.").

<sup>16</sup> See Charles Sabel, *Ungoverned Production*, in CONVERGENCE AND PERSISTENCE IN CORPORATE GOVERNANCE, 310 (Jeffrey Gordon & Mark Roe, eds. 2004).

<sup>17</sup> See also John Esser, *Institutionalizing Industry: The Changing Forms of Contract*, 21 LAW & SOCIAL INQUIRY 593 (1996) (presenting interview evidence that manufacturers are adopting new "long-term" contractual arrangements and, in turn, arguing that this reflects a shift in the underlying structure of industrial production). In this respect, the evidence presented in this article, which comes from the contracts themselves rather than via interviews, can be considered to corroborate Esser's empirical claim. There are a few important differences between this piece and Esser's argument, however: first, the ambition of my argument is different in that I am attempting to address the theory of contract design; and second, as will be discussed below, I do not necessarily consider these collaborative relationships "long-term."

uncertainty, collaborators are unable to clearly define either their goals or the means for achieving those goals. Thus, parties embark on a process of joint experimentation according to the logic Sabel identified. Contract's role is to institutionalize this learning process, to provide an architecture that prevents parties' explorations from leading to entropy. The necessity for such architecture is illustrated in recent microeconomic scholarship exploring the role of learning in coordination games.

Understanding contract as the institutionalization of a learning process calls into question the basic premise that contracts are primarily tools for aligning parties' divergent interests through the shifting of risk. Of course, the idea that contracts are used for other purposes than navigating interest conflicts is not new.<sup>18</sup> However, I argue that one of the key implications of contracting the learning process is that this institutionalization still plays a central role in interest alignment: namely, contracts that institutionalize learning align parties' interests as the collaborators jointly discover what those interests indeed are. I.e. contracts align interests but not only through shifting risk. I anticipate that this claim will strike many as controversial: it conceives of contract's role operating according to a logic significantly different from what legal and economics scholars have traditionally offered. That said, my hope is not to abandon outstanding theories of contract design but to complement them.

This re-conception has wide-ranging significance for a number of current debates. First, by investigating the actual contracts collaborators use, this article shows how parties privately address collaboration's vulnerabilities. This is meaningful in two respects: 1, it suggests a framework for approaching the issue of how the contract provisions that institutionalize learning can be improved; 2, the private ordering insights resulting from my analysis inform the public policy debates regarding how to support networked production. In short, this article lays the foundation for examining the important role contract plays in fostering innovation, a subject that has been overlooked in favor of analyses regarding intellectual property and antitrust issues. Second, re-conceiving contract design has important ramifications for how courts interpret and enforce contracts between collaborators. In short, a learning theory of contract design calls into question both the dominant contextualist and ascendant neoformalist approaches to contract interpretation.<sup>19</sup> Third, this re-conception sheds light on the boundaries of the firm. In particular, this paper provides a micro-foundation for the work Stefano Brusoni and colleagues have done on the relationship between knowledge and firm boundaries. It is hoped, in this regard, that this article might provide the beginnings of a bridge between economic theory and the network theory of economic sociologists. Finally, while standard theories of law and development stress reliable legal protection of property rights, the positive theory of contract design presented here introduces new avenues from which to consider law's impact on economic development.

---

<sup>18</sup> See generally D. Gordon Smith & Brayden King, *Contracts as Organizations*, University of Wisconsin Law School Legal Studies Research Paper No. 1037 (2007) (reviewing the various theories of contract design that have developed alongside orthodox economic theory).

<sup>19</sup> The issue of interpretation and related prescriptions is addressed fully in this article's sister paper. Matthew Jennejohn, *Contract Adjudication in a Collaborative Economy: Innovation, Intention, and Interpretation*, working paper Columbia University Center for Contract and Economic Organization (2008), <http://www2.law.columbia.edu/contracteconomics/papers/papers.html>.

The article has three important limits. First, because this article turns to three rich fields—economics, law, and sociology—for insights, it must sacrifice nuance in favor of a broader perspective.<sup>20</sup> Therefore, the argument here is best considered a foray, the purpose of which being to spark, not close, debate. A more complete treatment of many relevant sub-issues glossed over here will be undertaken at a later date in a more capacious format. Secondly, since part of my aim is to provide evidence of how innovation is organized on an economy-wide scale, I often refrain from delving into some of the differences between the various industries I examine. Again, following the broad canvassing presented here, I intend to explore separate industry trends in greater detail in subsequent work. Finally, I defer examining the ramifications of my argument for issues of law and development and of corporations, antitrust, intellectual property, contract, and employment law to later research.

The paper proceeds as follows: In Part II, for the purpose of providing the reader with context, I briefly describe the characteristics of the deverticalized economy. Part III presents the various theories that have been developed to explain how incomplete contracts are governed and discusses the ability of each to explain deverticalized production. Finding none of the outstanding theories able to fully explain how collaborations are controlled, Part IV outlines the theory of pragmatic governance developed by Sabel and colleagues along with evidence corroborating that theory. The evidence is mined from publicly-available contracts that were filed with the SEC as part of companies' reporting requirements.<sup>21</sup> I then argue for a re-conception of the theory of contract design. Finally, Part V summarizes my argument and outlines the ramifications of this new theory of contractual control for debates regarding contract interpretation, the theory of the firm, and the role law plays in promoting economic development.

## 2. The “Deverticalized” Economy

### 2.1 Three Hallmarks of the New Economy

The “new economy” has passed in the last decade from over-hyped miracle to vulnerable but persistent reality. Here “new economy” refers to a production system, found in both “new” and “old” industries alike,<sup>22</sup> defined by three complementary

---

<sup>20</sup> This article's cross-disciplinarity arises out of necessity, not from an agenda to concoct a clever or convenient “remix” of contemporary social science. The contracts and practitioners' literature examined below drive this analysis: where explanations from one field were found not fully convincing, arguments from other disciplines were considered. What results is an eclectic *positive* theory of contract design, an endeavor that has been neglected in the legal literature to date. See Karen Eggleston, Eric Posner & Richard Zeckhauser, *The Design and Interpretation of Contracts: Why Complexity Matters*, 95 NW. U. L. REV. 91, 93 (2000) (“the law review literature on contracts is almost completely devoid of the positive analysis of contracts.”).

<sup>21</sup> Two sources provided the contracts analyzed in this paper: first, a privately-maintained continuing legal education website called [www.oncle.com](http://www.oncle.com); and, second, the LexisNexis EDGARPlus database.

<sup>22</sup> Thus, Josh Whitford refers to the “new old economy”—e.g. manufacturing industries where traditional processes are giving way to new modes of production. JOSH WHITFORD, *THE NEW OLD ECONOMY*:

features: first, the de-integration of the vertically-integrated firm; second, the increasing prevalence of product innovation as the criterion upon which companies compete; and third, the use of collaborative arrangements as both a replacement for vertical integration and a means for accelerating innovation processes. Globalization, another hallmark of the new economy, underlies all three in that increased exposure to foreign markets pushes firms to embrace the three complementary strategies.

Over the first three quarters of the 20<sup>th</sup> century, firms vertically integrated production—i.e. design, manufacture, and marketing processes were all under the control of a single authority.<sup>23</sup> Beginning around the late 1970s, however, firms began deverticalizing: shedding processes not located within the firms' core competencies.<sup>24</sup> Resulting from deverticalization are not only leaner but also interconnected firms.<sup>25</sup> This network structure arises as manufacturers simultaneously give more business to fewer suppliers and encourage those suppliers to build relationships with end-users and other suppliers.<sup>26</sup> Firms pursue this strategy not only out of intentions to cost-save (the much-heralded impetus behind outsourcing) but also because “[b]y divesting non-core functions, lead firms can more quickly reap value from innovations while spreading risk in volatile markets.”<sup>27</sup> The networks between firms that arise are crucial to innovation<sup>28</sup>: in order to compete in the “high-speed learning race” characteristic of the new economy,<sup>29</sup> firms must “build and maintain an increasing number of ‘knowledge nodes’

---

NETWORKS, INSTITUTIONS, AND THE ORGANIZATIONAL TRANSFORMATION OF AMERICAN MANUFACTURING 2 (2005) [hereinafter Whitford, *New Old Economy*].

<sup>23</sup> ALFRED CHANDLER, *THE VISIBLE HAND: THE MANAGERIAL REVOLUTION IN AMERICAN BUSINESS* 285–6 (1977) (“The modern industrial enterprise—the archetype of today’s giant corporation—resulted from the integration of the processes of mass production with those of mass distribution within a single business firm. . . . By 1917 the integrated industrial enterprise had become the most powerful institution in American business and, indeed, in the entire American economy.”).

<sup>24</sup> Robert C. Feenstra, *Integration of Trade and Disintegration of Production in the Global Economy*, 12 *J. OF ECON. PERSPECTIVES* 31, 31 (1998); see also Whitford, *New Old Economy* at 17.

<sup>25</sup> Powell, *supra* note 5, at 301 (“Many firms are no longer structured like medieval kingdoms, walled off and protected from hostile outside forces. Instead we find companies involved in an intricate latticework of collaborative ventures with other firms, most of whom are ostensibly competitors.”); Luigi Zingales, *In Search of Foundations*, 55 *J. OF FINANCE* 1623, 1626 (2000); Richard Florida, *Regional Creative Destruction: Production Organization, Globalization, and the Economic Transformation of the Midwest*, 72 *ECON. GEOGRAPHY* 314, 327 (1996).

<sup>26</sup> Whitford, *New Old Economy* at 17.

<sup>27</sup> Timothy Sturgeon, *Modular Production Networks: A New American Model of Industrial Organization*, 11 *INDUSTRIAL AND CORPORATE CHANGE* 451, 452 (2002).

<sup>28</sup> The term “innovation” is used broadly in this paper to encompass any process that involves “the exploration and exploitation of opportunities for new or improved products, processes or services, based either on an advance in technical practice (“know-how”), or a change in market demand, or a combination of the two.” Keith Pavitt, *Innovation Processes*, in *THE OXFORD HANDBOOK OF INNOVATION*, 88 (Jan Fagerberg, David Mowery & Richard Nelson, eds. 2005).

<sup>29</sup> Whitford, *New Old Economy* at 18 (citing PAUL DiMAGGIO, *THE TWENTY-FIRST CENTURY FIRM* 222 (2001)); see also ROBERT PITOFSKY, HARVEY J. GOLDSCHMID & DIANE P. WOOD, *TRADE REGULATION: CASES AND MATERIALS*, 5TH ED. 402 (2003) (“In many high-tech industries, and increasingly in modern economies generally, successful innovation is a key to commercial success.”).

with lead users, universities, technical-service institutes, [and] user communities.”<sup>30</sup> Within these networks, firms engage in disciplined experimentation to realize innovative product development.<sup>31</sup>

## 2.2 Case Study: Apple Computer and SCI Systems

To illustrate the deverticalization phenomenon outlined above, it is useful to consider an example.<sup>32</sup> Following its largest quarterly loss to date, Apple announced, in 1996, that it was selling its primary manufacturing facility in Fountain, CO. What made this sale different from a typical attempt to generate cash flow through the sale of assets was that the plant was being sold to SCI Systems, an electronics contract manufacturing firm. The move puzzled those following the industry since the consensus at the time was that Apple struggled not from lack of demand but rather from an inability to meet demand.<sup>33</sup> In such a situation, one would expect Apple to invest in improving its manufacturing capability, not to sell it off. The sale of the Fountain plant can be understood, however, as a paradigmatic example of strategic deverticalization and collaboration.

The key fact of the deal was that the Fountain plant would still manufacture Apple computers. Rather than losing the manufacturing capacity entirely, Apple secured a three year deal with SCI for the production of Apple systems. In other words, Apple was outsourcing manufacturing. SCI could, of course, use the facilities to produce systems for Apple’s competitors. This, however, was a small price to pay for what Apple gained from the deal: first, a reduction in manufacturing overhead and inventory-carrying costs; and, second, the benefit of access to SCI’s economies of scale; and third, the collaboration allows Apple to achieve greater economies of scope, which may facilitate rapid innovation. Finally, and perhaps most importantly,

[t]he sale provided Apple with the ability to alter the volume of its production upward or downward at very short notice without installing or idling any of its own plant or equipment. Of particular interest to Apple’s management was the improved ‘upside flexibility’—the ability to quickly ramp production volumes upward to meet unexpected surges in demand—that the deal with SCI provided.<sup>34</sup>

SCI’s responsiveness was made possible through close inter-firm collaboration, specifically, JIT production. Thus, the Apple-SCI deal illustrates all three pillars of the new economy: Apple de-integrated by outsourcing production to SCI, an innovation

---

<sup>30</sup> Nicolai Foss, STRATEGY, ECONOMIC ORGANIZATION, AND THE KNOWLEDGE ECONOMY 28 (2005); see generally, Walter Powell & Stine Grodal, *Networks of Innovators*, in THE OXFORD HANDBOOK OF INNOVATION, 56 (Jan Fagerberg, David Mowery & Richard Nelson, eds. 2005).

<sup>31</sup> See e.g. Kathleen M. Eisenhardt & Behnam N. Tabrizi, *Accelerating Adaptive Processes: Product Innovation in the Global Computer Industry*, 40 ADMINISTRATIVE SCIENCE QUARTERLY 84 (1995).

<sup>32</sup> The information for this case study is taken from an article by Timothy Sturgeon on the network properties of modern production. Sturgeon, *supra* note 27, at 456-8 (2002).

<sup>33</sup> *Id.* at 457, fn5.

<sup>34</sup> *Id.* at 458.

process was part of the strategy, and the firms intertwined themselves in a close collaboration.



Statistics indicate that the Apple-SCI collaboration is not an outlier; rather, there is a strong trend towards deverticalization worldwide.<sup>35</sup> For instance, the international electronic contract manufacturing industry, of which SCI is a member, grew from a \$10 billion market in the early 1990s to an estimated \$275 billion by 2007.<sup>36</sup> Other industries have also deverticalized production: the number of R&D collaborations in the biotechnology sector increased ten-fold from the late 1970s to the end of the 1990s<sup>37</sup>; US firms' spending on offshored software development amounted to \$5.5 billion in 2000, with estimates of \$17.6 billion by 2008.<sup>38</sup> Thus, deverticalization is a matter of global importance.

### 3. Incomplete Contracting Theory

The Apple-SCI collaboration seems to invite hold-ups. Hold-up problems arise wherever firms make investments that have little or no value outside of the relation to which they are initially dedicated. When investments are highly relationship-specific the less vulnerable party can always threaten to withhold its contribution unless the terms of exchange are changed in its favor.<sup>39</sup> Vertical integration is traditionally viewed as the common mechanism for overcoming hold-ups: i.e. where relationship-specific investments stymie parties' efforts to collaborate, it becomes efficient for one of the parties to acquire the other, thus governing the relationship through ownership rather than contract.<sup>40</sup> As Part II illustrates, however, contemporary firms have been substituting property rights governance with contract mechanisms. This is puzzling because information asymmetries, transaction costs, and uncertainty<sup>41</sup> preclude parties from being able to draft all of the terms necessary to eliminate all forms of potential opportunism. In

<sup>35</sup> For a thorough overview of the spread of networked economic organization, see MANUEL CASTELLS, *THE RISE OF THE NETWORK SOCIETY*, VOL. 1, 2D ED., 163-215 (2000).

<sup>36</sup> PriceWaterhouseCoopers report available at [http://www.pwc.com/techforecast/pdfs/EMS\\_Web.pdf](http://www.pwc.com/techforecast/pdfs/EMS_Web.pdf)

<sup>37</sup> Nadine Roijackers & John Hagedoorn, *Inter-firm R&D Partnering in Pharmaceutical Biotechnology since 1975: Trends, Patterns, and Networks*, 35 RESEARCH POLICY 431, 432 (2006) (see fig. 1).

<sup>38</sup> SANDEEP SAHAY, BRIAN NICHOLSON & S. KRISHNA, *GLOBAL IT OUTSOURING: SOFTWARE DEVELOPMENT ACROSS BORDERS* 11 (2003); see generally Gary Gereffi & Timothy Sturgeon, *Globalization, Employment, and Economic Development: A Briefing Paper*, working paper, Massachusetts Institute of Technology 2 (2004) available at <http://web.mit.edu/ipc/publications/pdf/04-007.pdf>.

<sup>39</sup> The logic of the hold-up problem is that where a firm, such as SCI, has invested in assets highly specific to the relationship, the opportunity arises for the other party to leverage this investment into concessions: due to the high-specificity of the investment, the second-best use of the invested assets is significantly lower than the first-best; thus, the firm will concede more of the bargain's benefit to the party threatening to abandon the relationship. If parties are aware of this possibility before the bargain is struck, then they will be reluctant to bargain at all. A "hold-up" occurs. See Klein, *Why Hold-ups Occur* at 444-5.

<sup>40</sup> See generally OLIVER WILLIAMSON, *THE ECONOMIC INSTITUTIONS OF CAPITALISM* (1985).

<sup>41</sup> OLIVER HART, *FIRMS, CONTRACTS, AND FINANCIAL STRUCTURE* 23 (1995).

other words, contracts are very incomplete. But if contracts are incomplete, what is doing the work?

In this section, I judge the ability of the major theories of contractual control—property rights theory, self-enforcing contracts theory, and agency theory—to explain how incomplete contracts can govern deverticalization. I have also included a fourth approach: Baker, Gibbons, and Murphy’s “Contracting for Control” theory, which is a hybrid of property rights and self-enforcement theory. Contracting for control is included, even though this model is still under development, because the theory is both elegant and directly on point. While important differences exist between these four approaches, I group them together in that their primary concern is how parties control ex post opportunism.<sup>42</sup> My conclusion is that none of these theories provides an entirely complete explanation of how contract controls deverticalization. However, the purpose of this exercise is not to debunk, but rather to show where amendment is possible.

### 3.1 Theoretical Background

Before examining these four approaches, it is necessary to briefly consider the theoretical environment in which they are couched. The question of how parties control opportunism and yet provide for flexibility in adjusting their relationship as contingencies arise is an old one in both law and economics. Academic lawyers and economists working in the area of incomplete contracting typically cite the path-breaking work of Stewart Macauley and Ian Macneil on relational contracts<sup>43</sup> as the starting point for their inquiry. Macauley and Macneil’s fundamental insight was that to achieve a balance between flexibility and planning, parties often leave contracts incomplete and rely on informal governance.<sup>44</sup>

Despite their common pedigree, however, the two fields think of the problem of contractual incompleteness in slightly different ways. In lawyers’ conception, contracts are incomplete where they “fail[] to describe the obligations of the parties in each possible state of the world.”<sup>45</sup> Economists, on the other hand, think of contractual incompleteness differently: there, a contract is incomplete if it “fails to provide for the efficient set of obligations in each possible state of the world.”<sup>46</sup> The difference between the two conceptions is that, for an economist, a contract that fails to provide an efficient set of obligations in each state of the world is “‘informationally incomplete’ even though it is ‘obligationally complete’ in the sense that it does not contain any gaps.”<sup>47</sup> The

---

<sup>42</sup> In this, I follow Smith and King’s lead. Smith & King, *supra* note 18, at 19-20.

<sup>43</sup> Stewart Macauley, *Non-Contractual Relations in Business: A Preliminary Study*, 28 AM. SOC. REV. 55 (1963); Ian Macneil, *Contracts: Adjustment of Long-term Economic Relations under Classical, Neoclassical, and Relational Contract Law*, 72 NW. U. L. REV. 854 (1977-8).

<sup>44</sup> This informal governance is achieved through either social norms or, most fundamentally, through the reputational constraints created by “ongoing” relations. Ian Macneil, *The Many Futures of Contracts*, 47 S. CAL. L. REV. 691, 718 (1974).

<sup>45</sup> See Robert Scott & George Triantis, *Incomplete Contracts and the Theory of Contract Design*, 56 CASE W. RES. 187, 190 (2004).

<sup>46</sup> *Id.*

<sup>47</sup> *Id.*

upshot is that, under the economic view, the efficient set of obligations in an informational incomplete contract is not court enforceable—the assumption is that if the efficient set of obligations is simply not in the contract, the court cannot enforce them.

When discussing the contract design theories in this section, I will primarily have the economists' conception of incompleteness in mind. However, when addressing Charles Goetz and Robert Scott's treatment of relational contracting in the sub-section on agency theory, an amended—more “legal”—view of incompleteness is necessary. An important insight of the legal conception of incomplete contracting is that enforcement is not as cut-and-dried as economic models assume. Because “relational contracting” can refer to any situation—short or long-term—where the parties are unable to reduce important terms to defined obligations,<sup>48</sup> parties often use vague terms to try to approximate the efficient set of obligations, which complicates the courts' task of enforcing incomplete contracts.<sup>49</sup> In other words, parties to the contract are the first ones to monitor the application of such standards as the relationship proceeds; then, when disputes arise over whether the vague standard is being met, courts become involved.<sup>50</sup> Thus, court enforcement of explicit terms and self-enforcement through informal governance are not necessarily independent—they overlap to control the same behavior. The important thing to notice here is that loosening up the strict division between court enforcement of formal contract terms and self-enforcement of informal norms allows written contracts to take on a multidimensional character: contract clauses can speak simultaneously to both the immediate parties and a possible adjudicator.

### 3.2 Property Rights Theory

The model of incomplete contracting that Oliver Hart has developed with his colleagues Sanford Grossman and John Moore (“GHM”) is often referred to as the “property-rights” theory of governance because generic decision rights—characteristic of ownership—are understood to be the tools for governing circumstances not addressed in the contract.<sup>51</sup> In other words, GHM conceive of two types of decision rights: specific rights spelled-out in the contract and residual rights retained through the ownership of property.<sup>52</sup> While GHM proceed from this framework to build an elegant model of when control is more efficiently allocated via specific contract rights vis-à-vis residual property rights (and vice versa), our concern here is focused upon the actual nuts-and-bolts of their governance mechanism.

The GHM model posits a two-step process by which incomplete contracts are governed. First, parties set rules for performance under foreseeable contingencies. Ex ante rule setting allocates risks between parties according to their expected utilities, risk-sensitivities, and respective bargaining powers. Second, because some decisions are non-

---

<sup>48</sup> Charles Goetz & Robert Scott, *Principles of Relational Contracting*, 67 VA. L. REV. 1089, 1091 (1981) (“A contract is relational to the extent that the parties are incapable of reducing important terms of the arrangement to well-defined obligations.”).

<sup>49</sup> *Id.* at 195-6.

<sup>50</sup> This conception of relational contracting will be more fully examined below.

<sup>51</sup> Foss, *supra* note 30, at 28.

<sup>52</sup> *Id.*

contractible ex ante because certain contingencies are unforeseeable, parties to all but spot transactions will renegotiate terms ex post.<sup>53</sup> Such renegotiation places great strategic importance upon contractually determining the ex post control over key issues in the ex ante stage, since allocation of this control determines each party's later bargaining leverage.<sup>54</sup> Control rights rein in the possibility of opportunism by defining each party's rights as to who gets to make particular decisions in certain domains, regardless of contingencies. I.e. the party with the control right in a particular area will have the upper hand if its collaborator wants to renegotiate in that domain later.<sup>55</sup> Establishing the power balances for later renegotiations determines the incentives that then constrain parties' behavior.<sup>56</sup> Thus, parties govern their collaborations by bargaining over control rights and renegotiating when contractual gaps emerge.

An example illustrates how this theory explains the governance of incomplete contracting: imagine that parents and a babysitter are negotiating the terms of a night of care for the couple's toddler. Assume that the parents and the babysitter agree that they will talk on the phone mid-way through the evening. Such a conversation provides an opportunity for renegotiation: as the night's events unfold and uncertainty resolves, the parties can hash-out a new equilibrium over the phone in light of the new information. For example, assume that shortly after the evening begins, the child becomes truly inconsolable. The babysitter, exhausted after trying to calm the crying child for two hours, has an opportunity at the phone call to demand a higher price in order to continue his/her efforts for the remainder of the evening.<sup>57</sup> When renegotiation like this is possible, the parties have an incentive to limit the scope of renegotiation ex ante: thus, the parents may negotiate at the beginning of the evening for the right to determine the babysitter's level of effort in the event their child is distressed (such a right will, of course, cost them extra). This limits the scope of renegotiation by foreclosing the babysitter's attempt to raise the price of his/her effort during the phone call—the parents can point out that he/she agreed up front that they could determine his/her effort for the duration of the evening. Thus, the babysitter is constrained from defecting. In this way, the ex ante contractual allocation of control rights governs the relationship.

There are two reasons to believe that this model might not capture the full story of how deverticalization is governed. First, in highly uncertain markets, it is possible parties will be unable to agree on the assignment of a controversial control right. Explicitly allocating rights often makes adjusting those rights later more difficult—that, of course, is the logic of the GHM model. However, this means that it might be preferable to leave

---

<sup>53</sup> See, e.g., Douglas Baird, *Self-interest and Cooperation in Long-term Contracts*, 19 J. OF LEGAL STUDIES 583, 586 (1990) (“renegotiations [are used] to realign the obligations of the parties when conditions change unexpectedly”).

<sup>54</sup> Hart, supra note 41, at 3 (“the ex post allocation of power (or control) matters. Here power refers roughly to the position of each party if the other party does not perform (e.g. if the other party behaves opportunistically.”).

<sup>55</sup> George Baker, Robert Gibbons & Kevin Murphy, *Contracting for Control*, working paper, Massachusetts Institute of Technology at 8 (2006); [http://www.law.columbia.edu/null/Contracts+Conf+-+April+7-8,+2006+-+Paper+-+Gibbons?exclusive=filemgr.download&file\\_id=961193&showthumb=0](http://www.law.columbia.edu/null/Contracts+Conf+-+April+7-8,+2006+-+Paper+-+Gibbons?exclusive=filemgr.download&file_id=961193&showthumb=0).

<sup>56</sup> *Id.*

<sup>57</sup> The alternative being to give up and let the child cry the rest of the night.

the control right unassigned or, at least, to severely limit its scope.<sup>58</sup> In other words, there is a perverse incentive: since the more hazardous issues are those most likely to be renegotiated, parties have an incentive to postpone contracting on these points at the ex ante stage. If these issues are sticking points (as hazards tend to be), then both the inability to contract ex ante and the unwillingness to return to the issue in renegotiation might conspire to undermine the collaboration. This is not to say that it would never make sense to consummate a collaboration under the GHM model. Rather, the point is that there are reasonably imaginable scenarios where this governance mechanism will be insufficient to support a deal where collaboration would otherwise be efficient. The second problem is practical: a rapidly-changing economy driven by innovation makes frequent formal renegotiation prohibitively costly. Parties would have to constantly renegotiate as new contingencies arose. As change becomes more frequent and substantial—as is likely when partners are innovating—the control rights mechanism becomes more unwieldy: the renegotiations will have to occur more often, the adjustments more dramatic. Another way of saying this is that the division between ex ante and ex post negotiation begins to blur as the rate of change increases and that, as the ex ante/ex post division blurs, so does the applicability of the mechanism.

In any event, recent empirical work indicates that the GHM model of incomplete contracting does not fully explain the governance of inter-firm collaboration. According to the GHM model, we would expect control rights over ex post decisions to be allocated in order to create incentives to invest in the relationship ex ante.<sup>59</sup> Three studies have shown that the allocation of rights over ex post decisions has minimal or no impact on ex ante choices.<sup>60</sup> First, a study of collaboration agreements between biotech R&D firms and large pharmaceutical companies found that control rights were allocated most commonly to the pharmaceutical company, not the biotech—this runs counter to the GHM prediction, which would give more ex post control rights to the biotech in order to incentivize commitment.<sup>61</sup> Second, another study of agreements between internet portal developers and their clients found only a random pattern of control rights allocation.<sup>62</sup> And third, the final study of agreements between car manufacturers and dealers in Spain found that ex post control rights were assigned in areas that were most sensitive to the manufacturers—this finding suggests, contrary to the GHM theory, that “the *ex post* decision rights are not allocated to improve *ex ante* incentives to invest in the

---

<sup>58</sup> Richard Posner, *The Law and Economics of Contract Interpretation*, 83 TEX. L. REV. 1581, 1583 (2005) (“Parties may rationally decide not to provide for a contingency, preferring to economize on negotiation costs by delegating completion of the contract to the courts should the contingency materialize. This is especially likely if they think there is only a slight probability that the contingency will materialize. But even if they think the probability significant, they may prefer not to provide for the contingency. Deliberate ambiguity may be a necessary condition of making the contract; the parties may be unable to agree on certain points yet be content to take their chances on being able to resolve them, with or without judicial intervention, should the need arise.”).

<sup>59</sup> Baker et al., *supra* note 55, at 14.

<sup>60</sup> *Id.* at 11-14.

<sup>61</sup> *Id.* at 12-13; *see originally* Josh Lerner & Robert Merges, *The Control of Technology Alliances: An Empirical Analysis of the Biotechnology Industry*, 46 J. OF INDUSTRIAL ECONOMICS 125 (1998).

<sup>62</sup> Baker et al., *supra* note 55, at 13; *see originally* Daniel Elfenbein & Josh Lerner, *Ownership and Control Rights in Internet Portal Alliances, 1995-1999*, 34 RAND J. OF ECONOMICS 356 (2003).

relationship, but rather to improve the *ex post* decisionmaking itself.”<sup>63</sup> Thus, in order to explain how the new economy is governed, we must look further afield.

### 3.3 Self-enforcing Agreements

The “self-enforcing agreements” approach argues that informal constraints govern where explicit terms are ineffective. I.e. in a situation where a contract is incomplete, parties may be constrained not to act opportunistically due to an informal social rule. This is possible as the personal ties that develop over an extended relationship “exert pressure for conformity to expectations.”<sup>64</sup> There are two types of social pressure here, both closely-related: first, failing to conform to unwritten social norms results in damage to one’s reputation in the marketplace—reputational damage is important to actors intending to be repeat players;<sup>65</sup> and second, properly conforming to these social norms builds trust between parties<sup>66</sup>—an incentive to conform because “[t]rust counteracts fear of opportunistic behavior and as a result, is likely to limit the transaction costs associated with an exchange.”<sup>67</sup> Thus, under either the reputation or trust conceptions, the key premise to relational contracting is time: long-term interaction is usually necessary for informal norms to substitute for formal rules. Without long-term interactions, firms are concerned about neither their reputation in the marketplace nor the benefits of building trust with their collaborators.

One of the most influential piece in the economics literature on the subject of informal enforcement is Klein’s 1996 paper, which theorizes the complementarities between external court enforcement and internal self-enforcement.<sup>68</sup> Relying upon a concept of “reputational capital” that increases only over a player’s participation in a market,<sup>69</sup> Klein’s argument is that explicit (and rigid) contract terms create a “self-enforcing range” within which this reputational capital can then flexibly govern adjustment.<sup>70</sup> I.e. contract terms provide fall-backs for parties when radical changes in the state of the world (say the price of oil skyrockets and a petroleum supplier refuses to supply at the original price<sup>71</sup>) make defection from the agreement particularly tempting. The reason that parties do not rely exclusively on explicit terms, per Klein’s theory, is that contract terms provide a corresponding opportunity for a party to hold-up the

<sup>63</sup> Baker et al., *supra* note 55, at 14; *see originally* Philippe Aghion, Mathias Dewatripont, and Patrick Rey, *Partial Contracting, Control Allocation, and Cooperation*, unpublished working paper, Harvard University.

<sup>64</sup> Macaulay, *supra* note 43, at 63.

<sup>65</sup> Ranjay Gulati, *Does Familiarity Breed Trust? The Implications of Repeated Ties for Contractual Choice in Alliances*, 38 *ACADEMY OF MANAGEMENT J.* 85, 93 (1995) (“reputational considerations... play an important role in each firm’s potential for future alliances.”).

<sup>66</sup> *Id.* at 92 (“At the organizational level, observers point to numerous examples of ‘preferential, stable, obligated, bilateral trading relationships’ to illustrate that firms develop close bonds with other firms through recurrent interactions.”).

<sup>67</sup> *Id.* at 93.

<sup>68</sup> Klein, *Why Hold-ups Occur* at 455 (“Unlike standard economic models, the probabilistic hold-up framework presented here implies a fundamental complementarity between court enforcement and private enforcement.”).

<sup>69</sup> *Id.* at 449-50.

<sup>70</sup> *Id.* at 444.

<sup>71</sup> *Eastern Airlines v. Gulf Oil Corp.* 415 F. Supp. 429 (1975).

relationship through litigation.<sup>72</sup> Thus, the parties use self-enforcement to govern more minor adjustments in the relationship. If self-enforcement is particularly robust—e.g. the parties, who are long-term players in a well-defined market, face significant reputational constraints—then the range of adjustments governed internally can be quite broad.<sup>73</sup> The important thing to note is that court enforcement of explicit terms is a complementary but independent process to self-enforcement in Klein’s model.

Although reputation’s constraining effect is intuitive, a return to the babysitter example will clearly show its role in governing incomplete contracts. Imagine, again, that the toddler becomes inconsolable shortly after the parents leave. Although the agreement between the parents and the babysitter did not explicitly address what to do in such a situation, the babysitter will make efforts to meet the parents’ expectations because he/she is concerned about his/her reputation in the wider community. For example, if the parents come home to a distraught toddler, it is likely that word will get out to the neighbors that the babysitter failed to care for the child adequately. This, of course, negatively impacts the babysitter’s ability to charge a premium for his/her services in the future. Thus, reputational considerations align the parties’ interests where the formal contract terms were silent.

Work on informal constraints has burgeoned among both economists and law and economics scholars. Both in-depth case studies<sup>74</sup> and broad-ranging analyses<sup>75</sup> have substantiated the claim that self-enforcement through reputational effects is an important governance mechanism. However, while there is no question that informal constraints play a role in governing incomplete contracts, there are obvious limits to their efficacy.

First, it is not safe to assume that games repeat between collaborators. As Baker, Gibbons, and Murphy note in one of their papers on contracting in the biotechnology industry: of 12,500 strategic alliance agreements between biotech companies analyzed, 9462 pairs of firms never consummated more than one deal and only 57 pairs did more than five together.<sup>76</sup> Nonetheless, they argue that “the prospect of continuing interactions”<sup>77</sup>—not actual repeated games—is what creates trust between the parties. This seems a rather weak constraint. At the opening stages of a collaboration where

---

<sup>72</sup> Klein, *Why Hold-ups Occur* at 462 (“[H]old-ups are caused by rigid court enforcement of the imperfect and incomplete terms transactors choose to write in their contracts.”).

<sup>73</sup> *Id.* at 458.

<sup>74</sup> See e.g. Lisa Bernstein, *Opting Out of the Legal System: Extralegal Contractual Relations in the Diamond Industry*, 21 J. LEGAL STUD. 115 (1992); Lisa Bernstein, *Private Commercial Law in the Cotton Industry: Creating Cooperation through Rules, Norms, and Institutions*, 99 MICH. L. REV. 1724 (2001); Barak Richman, *How Communities Create Economic Advantage: Jewish Diamond Merchants in New York* Harvard Law and Econ. Discussion Paper No. 384, 22-51 (2004), available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=349040](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=349040).

<sup>75</sup> See e.g. Robinson & Stuart, *supra* note 9; Gulati, *supra* note 65.

<sup>76</sup> Baker et al, *supra* note 55, at 21 (reasoning that the *possibility* of a long-term relationship is the source of reputational constraint)(italics added).

<sup>77</sup> *Id.*

relational ties are weak,<sup>78</sup> it is questionable whether “the prospect of continuing interactions” is enough to govern. Modern firms often require an intimate level of collaboration immediately: parties who have never collaborated before agree to exchange personnel, openly share proprietary information, rely upon JIT supplying, etc. Is the hope for continuing interactions enough to see parties through this period?

Furthermore, even if games do repeat and these relationships are, indeed, long-term, there is little reason to assume that trust will necessarily build over time. Whether or not A trusts B depends upon a judgment of whether B’s activity conforms to particular behavioral norms—i.e. A must interpret B’s decisions. As 20<sup>th</sup> century jurisprudence has taught us, interpretations are bound to be controversial.<sup>79</sup> For example, those of us who are considered untrustworthy rarely acquiesce to the negative judgment of our behavior; rather, we seek to justify our actions. Therefore, a relationship can be both functional and yet plagued by controversy and, thus, progress without the accumulation of trust: over time, some behavior might be classified as appropriate, some as inappropriate, and some as falling within a perpetually contentious “gray area.” All that may accumulate is argument. Indeed, research in the auto industry reveals that US companies who have sold for many years to a primary customer have less trust in that customer than in customers to whom they have sold for shorter time periods.<sup>80</sup> Note also that researchers have described the dynamics between collaborating firms as “close but adversarial.”<sup>81</sup> As we will see in Part IV, this is because modern inter-firm cooperation, which involves the constant disruption of routines, destabilizes relationships as much as it builds them. Collaborators walk the fine line between a manufacturer’s “legitimate (and effective) efforts to push suppliers to ferret out cost reductions” and an “inflexible application of a hard and nonnegotiable target.”<sup>82</sup> Thus, relations between customers and suppliers are “conflictual partnerships.”<sup>83</sup>

This is not to say that collaboration only undermines trust; rather, the point is that trust is a far more nuanced variable in this analysis than what standard accounts allow.<sup>84</sup>

<sup>78</sup> Christine Beckman, Pamela Haunschild & Damon Philips, *Friends or Strangers? Firm-Specific Uncertainty, Market Uncertainty, and Network Partner Selection*, 15 ORGANIZATION SCIENCE 259, 261 (2004) (“New relationships, on average, are typically weaker... than existing relationships”).

<sup>79</sup> See generally RONALD DWORKIN, LAW’S EMPIRE (1986).

<sup>80</sup> Mori Sako & Susan Helper, *Determinants of Trust in Supplier Relationships: Evidence from the Automotive Industry in Japan and the United States*, 34 J. OF ECON. BEHAVIOR AND ORG. 387, 400 (1998) (presenting data that indicated a “weak, yet significant, finding that the longer the contract length... the higher the level of distrust, contrary to the prediction.”).

<sup>81</sup> Ram Mudambi & Susan Helper, *The ‘Close but Adversarial’ Model of Supplier Relations in the U.S. Auto Industry*, 19 STRAT. MGMT. J. 775, 776 (1998).

<sup>82</sup> Whitford, *New Old Economy* at 102.

<sup>83</sup> Gary Herrigel & Volker Wittke, *Varieties of Vertical Disintegration: The Global Trend towards Heterogeneous Supply Relations and the Reproduction of Difference in US and German Manufacturing, in CHANGING CAPITALISMS? INTERNATIONALIZATION, INSTITUTIONAL CHANGE, AND SYSTEMS OF ECONOMIC ORGANIZATION* (Glenn Morgan, Richard Whitley & Eli Moen, eds. 2005) (en12).

<sup>84</sup> See e.g. Whitford, *New Old Economy* at 96 (where the author uses “the familiar notion of ‘trust’ as a means to negotiate uncertainty, though making a distinction between two types—*competence trust* and *trust as reliability*—that allow for a clearer discussion of interorganizational (as opposed to interpersonal) relationships.”) (original italics; internal citations omitted); see also John Paul MacDuffie & Susan Helper, *Collaboration in Supply Chains with and without Trust, in THE CORPORATION AS COLLABORATIVE*

For example, the results of a National Institute for Standards and Technology study on the execution of successful R&D alliances found that

[e]ffective contractual provisions and governance arrangements for alliance management have a positive effect on alliance success in terms of delivering overall value and generating patent applications. Goodwill trust among alliance partners has a weakly negative effect on overall value, and a negative effect on patent application. These results suggest that successful alliances do not simply depend on goodwill trust but develop contractual-based trust based on effective contractual provisions and governance arrangements. In other words, in alliance management, one would do well to “Trust, but verify.”<sup>85</sup>

In this account, the trust that has an impact on a collaboration’s success is not separate from the contract<sup>86</sup> but entwined within explicit contract terms; it is “contractual-based”—i.e. derived directly from the proper functioning of the contract’s explicit terms. This idea of “contractual-based trust” is, admittedly, not easy to grasp from the traditional formal contract-versus-informal norms paradigm: one wonders whether trust really plays a meaningful role at all in governance where trust is based directly on a well-functioning written contract. It seems like the contract is doing all the work. But this only illustrates my point: the dynamics between informal self-enforcement and explicit contract terms is more complicated than Klein’s assumptions allow. Thus, I think assuming that long-term relations necessarily lead to increased trust is to oversimplify the relational dynamics we observe.

Second, although dense networks appear a more convincing ground for a concern for reputation, there is even here cause for doubt. The argument regarding network density is that other market players, once they learn of the defecting party’s behavior, will be reluctant to transact with that party and, thus, will be able to extract a premium from that party in future dealings.<sup>87</sup> For firms located at the center of the network, information about their dealings can probably flow easily between companies. Thus, for these core firms, who are repeat players in the entire market, the reputational costs of renegeing may be high indeed. It is important to note, however, that these core firms also enjoy the

---

COMMUNITY, 417, 419 (Charles Hecksher and Paul Adler, eds. 2005) (“In the USA there are frequent attempts to achieve the necessary levels of collaboration without trust; but this approach is marked by internal contradictions which, we believe, make it unlikely that it can stabilize as a lasting model. Thus, we will argue, the industry is converging from all sides on a form of pragmatic collaboration, involving substantial levels of trust, though more open and formalized than the traditional Japanese system”).

<sup>85</sup> Jeffrey Dyer, Benjamin Powell, Mariko Sakakibara & Andrew Wang, *Determinants of Success in R&D Alliances*, U.S. Department of Commerce, National Institute of Standards and Technology Report No. 7323, at x and 34 (2006).

<sup>86</sup> That Klein conceives of informal and formal constraints as separate complements is clear. Klein, *Why Hold-ups Occur* at 455 (“The... hold-up framework here implies a fundamental complementarity between court enforcement and private enforcement. When employed together the mechanisms are substitutes in demand in the sense of a positive cross-price effect, i.e., an increase in the price of one increases the demand for the other.”).

<sup>87</sup> *Id.* (“If the violation of the contractual commitment is taken account of by other transactors... the transactor engaging in the hold-up will face increased costs of doing business in the future.”).

status of industry heavy-weights: i.e. they have bargaining leverage which allows them to overlook reputational considerations.<sup>88</sup> Furthermore, if an industry network has a hub-and-spoke structure,<sup>89</sup> it seems far less likely that information about second- or third-tier firms will flow readily through the network. The fact that firms are constantly entering and exiting a large and expanding global market such as biotechnology further complicates reputational constraints: such size and growth not only hampers information transfer about particular companies' behavior<sup>90</sup> but also introduces new (and diminishes existing) norms against which reputation is measured. In other words, the behavior against which social norms are supposed to act might displace those very norms if enough members of the community adopt the activity. It is noteworthy in this regard that the most illuminating work on private ordering has focused primarily upon relatively static and insular industries: Southern cotton growers,<sup>91</sup> ultra-orthodox Jewish diamond merchants,<sup>92</sup> Maghribi traders,<sup>93</sup> etc. Undoubtedly, social norms are a ready currency in the confines of Shasta County.<sup>94</sup> Relational governance's efficacy is more doubtful, however, in volatile global markets.<sup>95</sup> Thus, there is reason to doubt the efficacy of reputation's constraining effect for the vast majority of firms all but the most concentrated industries.

My point here is not that ideas of trust and reputation are analytical dead-ends; rather, my argument is that the role of informal constraints are more nuanced than self-enforcement theory allows. Thus, I do not reject out of hand attempts to apply self-enforcement theories to the governance of collaborations; however, I find any such attempt that uses traditional conceptions of self-enforcement problematic. We need a new idea of what self-enforcement is. My own strategy, outlined in Part IV, is to forego the language of self-enforcement entirely in favor of a different approach.

### 3.4 Baker, Gibbons, and Murphy's Hybrid Theory

George Baker, Robert Gibbons, and Kevin Murphy ("BGM") have developed a sophisticated hybrid theory that shows formally how collaborations might be governed efficiently through a modified version of GHM's property rights approach that

<sup>88</sup> See e.g. Whitford, *New Old Economy* at 65 (quoting an interviewee who described the major automakers' leverage within collaborative relationships as "the big economic hammer.").

<sup>89</sup> See e.g. George Baker, Robert Gibbons & Kevin Murphy, *Strategic Alliances: Bridges Between "Islands of Conscious Power,"* unpublished manuscript, Massachusetts Institute of Technology at 4 (2004), available at <http://web.mit.edu/rgibbons/www/Strategic%20Alliances.pdf> (showing a hub-and-spoke network in the biotechnology industry centered upon 32 core firms).

<sup>90</sup> One is reminded of Alfred Marshall's quip that "money is more portable than a good reputation." Ronald Coase, *The Nature of the Firm: Meaning*, in *THE NATURE OF THE FIRM: ORIGINS, EVOLUTION, AND DEVELOPMENT*, 58 (Oliver Williamson & Sidney G. Winter, eds. 1991).

<sup>91</sup> Bernstein, *supra* note 74 [cotton industry].

<sup>92</sup> Richman, *supra* note 74.

<sup>93</sup> Avner Greif, *Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Traders' Coalition*, 83 *AMER. ECON. REV.* 525 (1993).

<sup>94</sup> See generally ROBERT C. ELLICKSON, *ORDER WITHOUT LAW: HOW NEIGHBORS SETTLE DISPUTES* (1991).

<sup>95</sup> Bernstein seems to reference this in a footnote: "Over the past ten years, however, technological advancements and other market changes have occurred that may, over the long run, undermine the ability of [cotton] industry institutions to promote cooperation." Bernstein, *supra* note 74, n.233 [cotton industry].

incorporates insights from the self-enforcement literature. BGM argue that control rights do govern collaborations, but not implicitly as the GHM model argues; rather, such rights govern explicitly through ex ante allocation of authority to make particular ex post decisions.<sup>96</sup> I.e. parties adapt as uncertainty resolves by assigning the control over a particular realm of adaptation decisions to one of the parties.<sup>97</sup> Although they concede that this mode of governance can not govern one-off transactions between collaborators efficiently,<sup>98</sup> BGM claim that it can govern long-term relationships.

Building off of Klein's claim that control rights create a "self-enforcement range" where reputational considerations govern, BGM argue that decision rights can efficiently govern inter-firm collaborations where those collaborations are repeated games. In repeated game situations, a party can choose an outcome, despite immediate loss, that produces a higher social surplus than what is available in a spot transaction because of the likelihood that the other party will return the favor in the future. Whether or not a party actually does so depends upon whether the payoff from the optimal relational decision is greater than the party's temptation to renege. The authors formally model the temptation to renege as

$$R_i(s) \equiv \pi_i(d_i^*(s), s) - \pi_i(d^{RC}(s), s)^{99}$$

and claim that the optional relational decision ( $d^{RC}$ ) can be implemented if and only if

$$R_i \equiv \text{MAX} R_i(s) \leq 1/r (V(d^{RC}(\cdot)) - V^{SP})$$

—i.e. if and only if, first, the party's relational payoff exceeds the spot market payoff and, second, the resulting difference is greater than or equal to that party's maximum reneging temptation.<sup>100</sup> This then leads to their governance prescription: by assigning the right to make a particular decision to the party with the lowest incentive to renege, formal contracts can complement the informal reputational constraints at work.<sup>101</sup>

A return to the babysitter example used above shows how this governance model operates. In the BGM model, the babysitter and the parents allocate control rights ex ante to the party best positioned to make an efficient decision not to narrow the scope of

<sup>96</sup> Baker et al., supra note 55, at 2.

<sup>97</sup> *Id.*; see originally Herbert Simon, *A Formal Theory of the Employment Relationship*, 19 *ECONOMETRICA* 293 (1951).

<sup>98</sup> Baker et al., supra note 55, at 19 (“[N]o allocation of decision rights can achieve [the first-best outcome] with spot interaction... However, a relational contract could achieve first-best adaptation, if either party agreed to do what the other party preferred in certain states.”).

<sup>99</sup> Where  $R_i$  is the temptation to renege,  $s$  is a given state of the world,  $\pi_i(d_i^*(s), s)$  is the party's payoff from reneging, and  $\pi_i(d^{RC}(s), s)$  is the party's payoff from implementing the relational decision. *Id.* at 16.

<sup>100</sup> Where  $R_i$  is, again, the reneging temptation,  $\text{MAX} R_i(s)$  is the maximum temptation during a given state of the world,  $r$  is interest rate per period during the time of the repeated game,  $V(d^{RC}(\cdot))$  is the optimal payoff from the relationally implemented decision rule, and  $V^{SP}$  is the optimal payoff from a spot transaction. *Id.* at 17.

<sup>101</sup> *Id.* at 15-17, 19-20.

renegotiation.<sup>102</sup> For example, the right to decide the level of the babysitter's effort in attempting to console the crying child should be given to the party most likely to choose the outcome that is efficient for both parties. But how can any one party be trusted to make such a decision? Such trust is possible where games repeat: although either party has an incentive to chisel on the agreement in the short term,<sup>103</sup> the fact that they are in a long-term, recurring relationship creates an incentive for the party with the control right to forego the immediate payoff and make a decision in accordance with the other party's preference. The question then is which, the incentive to choose the other party's preference or the temptation to renege, is more powerful. BGM argue that efficient governance is achieved when the party with the lowest renege temptation has the decision right. So, if the babysitter is known to pursue the immediate payoff more readily than the parents (say, the babysitter has little stamina, is lazy, etc.), then it is optimal, over time, to give the decision right to the parents.

Empirical research is necessary to determine whether the BGM model's predictions play out. Indeed, since BGM's theory is still under development, it would be premature to draw any lasting conclusions. However, I am not entirely convinced that "contracting for control" can provide a complete explanation of the behavior observed here for two reasons. First, the BGM approach is susceptible to the criticisms outlined in section C above because it explicitly relies upon Klein's self-enforcement framework. In other words, if games do not repeat between collaborators and/or if reputational information does not readily flow through an industry network, then BGM's governance system malfunctions. Secondly, the BGM model assumes that the parties' renege temptations ( $R_i$ ) can be calculated *ex ante*. If, however, it is difficult to calculate  $R_i$  due to intense uncertainty, then parties run the risk of allocating control rights arbitrarily. If such is the case, then the governance system implodes: the party with the greater renege temptation may be accidentally assigned the control right. Furthermore, the model also assumes that the parties can calculate the optimal relational decision ( $d^{rc}$ ) *ex post*. If, however, uncertainty is persistent, then it will even be difficult for the party with the control right to make an efficient decision. As will be discussed more fully below, collaborative innovation creates environments of such pervasive uncertainty.

### 3.5 Agency Theory

Although agency theory passed into common parlance long ago, it is nonetheless useful to recount the theory's general contours before considering its applicability to deverticalized production. The problem agency theory addresses is a situation where the "cooperating parties have different goals and divisions of labor."<sup>104</sup> Such a situation

---

<sup>102</sup> Note that, in BGM's model, renegotiation is not available. *Id.* at 15 ("In particular, in a departure from the GHM property-rights approach, we assume that the decision  $d$  is not contractible even after the state  $s$  has been observed."). This assumption that renegotiation cannot be efficient is consistent with situations where the parties' activities are either not observable or verifiable: e.g. the parents may not agree to renegotiate with the babysitter if they cannot not reliably ascertain whether or not he/she did indeed continue the effort to console the child.

<sup>103</sup> This is why the BGM model does not explain one-off transactions.

<sup>104</sup> Kathleen Eisenhardt, *Agency Theory: An Assessment and Review*, 14 THE ACADEMY OF MANAGEMENT REVIEW 57, 58 (1989).

raises two potential problems: first, it is possible that the goals of the principal and agent will conflict and that, due to asymmetric information, the principal will be unable to observe the agent's activity; second, it is possible that the apportionment of risk between the two parties will be undercut if the parties have different risk preferences.<sup>105</sup> In response to the moral hazard and adverse selection problems that arise in such situations, the principal is theorized to have two options: first, she may invest in information systems that allow for better monitoring of the agent's behavior; or second, the principal and agent can enter into a contract on the outcomes of the agent's behavior.<sup>106</sup> This latter route "motivates behavior by coalignment of the agent's preferences with those of the principal, but at the price of transferring risk to the agent."<sup>107</sup> Risk is transferred to the agent because a particular outcome is dependent upon more than the agent's behavior alone.<sup>108</sup> Thus, it follows that the more contingent variables affecting the outcome, the more uncertainty for the agent. In the face of such uncertainty, the agent will either charge a premium or will attempt to limit its risk exposure to unforeseen contingencies through additional contract terms. Note, however, that principals and agents are often unable to "reduce[e] important terms of the[ir] arrangement to well-defined obligations"<sup>109</sup> because of this uncertainty.<sup>110</sup>

To explain how such relationships are governed, Charles Goetz and Robert Scott present a nuanced adaptation of agency theory.<sup>111</sup> They argue that, where specific obligations are not clear enough to establish meaningful performance standards, parties compensate for contractual incompleteness through incentive mechanisms. These incentive mechanisms typically take a two-step form. First, parties specify a general performance standard, such as a "best efforts" clause, for each party.<sup>112</sup> Second, the parties then include in the contract monitoring and/or bonding mechanisms that police the parties' efforts to meet those performance standards.<sup>113</sup> A return to our example will illustrate how this model of governance works. According to agency theory, in order to control the babysitter's behavior, the couple will set rules for the care of the child.<sup>114</sup> Their ability to draft a contract (the parents are lawyers, no doubt) that sets forth all of the

<sup>105</sup> *Id.*

<sup>106</sup> *Id.* at 61.

<sup>107</sup> *Id.*

<sup>108</sup> *Id.* ("The issue of risk arises because outcomes are only partly a function of behaviors.")

<sup>109</sup> Goetz & Scott, *supra* note 48, at 1091.

<sup>110</sup> *Id.* at 1090.

<sup>111</sup> Goetz and Scott do not explicitly present their theory as an application of principal-agent theory; this is my interpretation of their argument. I chose Goetz and Scott's piece as a proxy for the wider literature on agency theory as applied to incomplete contracting because its canonical status in the law & economics literature makes the discussion here more accessible to the legal reader. For the formal work on agency theory and incomplete contracts see Bengt Holmström & Paul Milgrom, *The Firm as an Incentive System*, 84 AM. ECON. REV. 972 (1994); Bengt Holmström & Paul Milgrom, *Multitask Principle-Agent Analyses: Incentive Contracts, Asset Ownership, and Job Design*, 7 J. L. ECON. & ORG. 24 (1991); Bengt Holmström & Jean Tirole, *Transfer Pricing and Organizational Form*, 7 J. L. ECON. & ORG. 201 (1991).

<sup>112</sup> Goetz & Scott, *supra* note 109, at 1092. Note that the authors also discuss other contract clauses, most notably unilateral termination clauses, in addition to best efforts clauses. See *Id.* at 1130-49 (extending their model to address unilateral termination). However, since these terms are functionally equivalent for the purposes of this analysis, only best efforts is discussed here.

<sup>113</sup> *Id.*

<sup>114</sup> Note that this relationship is not necessarily long-term.

babysitter's specific obligations is, however, hampered by uncertainty: they cannot foresee the likelihood, for instance, that the child will come down with the flu, that the child will ransack the home office while the babysitter loads the dishwasher, that the electricity will go out that evening, that the house will be burgled, etc. Thus, the parents cannot draft a contract that includes every rule for every possible contingency. Under Goetz and Scott's mechanism, the parents, once they have given whatever specific rules feasible (e.g. call 911 in life-threatening situations), would require the babysitter to use his/her "best efforts" to address contingencies as they arise and would monitor the babysitter's performance throughout the evening with, say, regular phone calls, periodic visits from the next-door neighbor, and a final report at the night's conclusion. Goetz and Scott argue that such a system is designed to incentivize the effort required to maximize the relationship's joint net product.<sup>115</sup> I.e. as the night progresses and the babysitter faces contingencies that were not addressed *ex ante* and is thus tempted to shirk, the prospect of being held accountable for not rendering his/her "best efforts" induces the babysitter to consider the parents' interests and increase his/her output accordingly.

Although this system of flexible performance standards and monitoring mechanisms is conceived to be often self-enforcing, courts may be asked, nonetheless, to resolve a dispute over whether a party's particular efforts were indeed "best." The problem the court faces in such a circumstance: how is it to determine what "best efforts" exactly entails? Goetz and Scott argue that the relationship's "optimal-output" best defines what "best efforts" means.<sup>116</sup> In order to calculate this optimal output, the court is to use the optimal output of vertically integrated production as a baseline against which the parties' actual output can be judged.<sup>117</sup> I.e. the court is to figure out what optimal output would be by looking at production output in vertically integrated competitors and extrapolating from there.<sup>118</sup> Therefore, the court's role in Goetz and Scott's theory is to intervene in the self-enforcement process, thus blending internal and external enforcement mechanisms.

Does this approach explain how deverticalization is governed? My review of contracts between collaborators in a number of industries provides the empirical answer to that question: agency theory does not completely explain the governance of deverticalization. On a theoretical level, however, it is important to note that a principal-agent governance system only works if the parties can determine at any given moment what optimal output should be. I.e. a sophisticated array of incentives and monitoring mechanisms is useless to a principal that does not know clearly the standard to which it should hold its agent. This holds for court enforcement also: the court must be able to reliably approximate what "best efforts" should entail in the given situation. As will be discussed more fully below, such a determination of optimal output is extremely problematic due to the endemic uncertainty inherent to innovation.

---

<sup>115</sup> *Id.* at 1114.

<sup>116</sup> *Id.* at 1117.

<sup>117</sup> *See id.* at 1123.

<sup>118</sup> *Id.* at 1123.

#### 4. A Theory of Generative Contracting

In this part, I argue that deverticalized production is governed, at least in significant part, by a logic that has been overlooked in the contract design literature. Based on an analysis of hundreds of contracts taken from a variety of industries, my argument is that parties are using contracts to build novel governance systems that limit opportunism by immersing parties in joint learning processes. While this conception of contract design bears some resemblance to Goetz and Scott's agency approach—in that flexibility is to be found within the contract itself and not through either the effects of residual control rights or external informal constraints—the contract mechanisms observed here are not recognizable from any of the outstanding theories. Thus, I consider this a new, if complementary, theory of contract design.

My argument in this part unfolds as follows: as a prelude to an examination of the contract evidence, I briefly sketch the theory of pragmatic coordination of Sabel et al. Turning to contracts from a number of “new economy” industries, I then show that the pragmatic coordination logic is found in agreements controlling deverticalized production. The following question then arises: how are we to understand this new contracting behavior? These contract mechanisms are puzzling because pragmatic coordination was originally conceived as an alternative to governance through explicit contractual governance.<sup>119</sup> And yet here we find pragmatic coordination formalized in the contracts themselves. Put another way: if interest alignment is contract's *raison d'être*, as economic theory tells us, then why would parties bother to include a joint learning process in their contracts? It would seem that parties' interests would not diverge on this subject. Furthermore, if we stick to the assumption that contracts are for interest alignment, what role does a learning process play in such? Although it is tempting to conclude that transaction cost economics' assumption that contracts are created for the purpose of aligning divergent interests is simply too narrow, I pause before doing so because I understand the need for a joint learning process to reflect parties' attempt to cope with uncertainty. In other words, rather than arguing for another view of the cathedral—that contracts are not only about interest alignment but also about something else entirely—I argue that the pragmatic learning process institutionalized in these contracts speaks directly to the issue of interest alignment. Thus, my hope is that the framework presented below provides a foundation for understanding not only these new types of contract mechanisms but also how they interact with governance systems that have been studied for some time now.

##### 4.1 Pragmatic coordination

---

<sup>119</sup> See generally Sabel, *supra* note 16.

Charles Sabel, in a theory developed over a number of papers,<sup>120</sup> argues that firms avoid hold-ups in their collaborations through the use of “pragmatic governance” or “pragmatic coordination.” Sabel’s theory can be summarized as follows: pragmatic coordination is the method by which firms jointly explore the design, production, and organizational ambiguities endemic to innovative economic activity.<sup>121</sup> As firms jointly inquire into what to produce and how to produce it, they publicize to each other information as the collaboration unfolds—this whittles away at information asymmetries that might arise and render parties vulnerable to exchange.<sup>122</sup> I.e., in an environment of open information, collaborators are able to monitor one another’s current behavior.<sup>123</sup> Transparency governs. Maintained “visibility” between parties allows them to adjust to change and to meet the potential of the collaboration.<sup>124</sup> Thus, these pragmatic mechanisms provide not only the superstructure for coordinating economic activity but also a governance mechanism with which to police potential defectors.

Helper, MacDuffie, and Sabel identify three integrated mechanisms that are characteristic of pragmatic production: benchmarking, simultaneous engineering, and error detection/correction institutions.<sup>125</sup> This paper conceives of benchmarking and error detection/correction as the core mechanisms and simultaneous engineering as the subject of pragmatic governance. While separating these three categories is analytically helpful, one should not forget that they comprise a holistic system.

#### 4.1.1 Simultaneous Engineering.

“Simultaneous engineering” is a catch-all phrase for the immediate, side-by-side cooperation between collaborators. Also called “concurrent” engineering, it takes place where “‘upstream’ and ‘downstream’ steps proceed simultaneously, each taking account of the (changes in the) requirements of the other.”<sup>126</sup> Just-in-time production, which requires interpenetration between collaborators to achieve the quick adjustment capabilities necessary for minimal inventory,<sup>127</sup> is a classic example of simultaneous engineering. The close proximity necessary for simultaneous engineering to work creates an environment of rich information sharing, a key ingredient for governing inter-firm

---

<sup>120</sup> See Sabel, *supra* note 14; Charles Sabel, *An American view of the Novel Universalism of Japanese Production Methods and Their Awkward Fit with Current Forms of Corporate Governance*, paper presented at Conference on Socio-Economic Systems of the Twenty-First Century, Tokyo (1996); Charles Sabel, *A Real-Time Revolution in Routines*, in *THE FIRM AS A COLLABORATIVE COMMUNITY*, 106 (Charles Heckscher & Paul Adler, eds. 2006); Charles Sabel & Jonathan Zeitlin, *Neither Modularity nor Relational Contracting: Inter-Firm Collaboration in the New Economy*, 5 *ENTERPRISE AND SOCIETY* 388 (2004).

<sup>121</sup> Helper et al., *Pragmatic Collaborations* at 445.

<sup>122</sup> *Id.*

<sup>123</sup> Sabel has referred to this as “learning by monitoring.” Sabel, *supra* note 14.

<sup>124</sup> Harry Glasspiegel, *Pricing the Outsourcing Deal: Financial Drivers for Outsourcing Contracts*, in *THE OUTSOURCING REVOLUTION 2005: PROTECTING CRITICAL BUSINESS FUNCTIONS* 431, 434 (John F. Delaney & William A. Tanenbaum, eds., 2005).

<sup>125</sup> Helper et al., *Pragmatic Collaborations* at 445.

<sup>126</sup> Sabel, *supra* note 120 [Real-Time Revolution], at 45.

<sup>127</sup> JOHN K. HALVEY & BARBARA MURPHY MELBY, *INFORMATION TECHNOLOGY OUTSOURCING TRANSACTIONS: PROCESS, STRATEGIES, AND CONTRACTS*, 2D ED. 138-9 (2005).

relationships.<sup>128</sup> For instance, as collaborating teams begin working on their assigned projects, they encourage their partner teams to alter designs and processes in order to realize greater efficiency.<sup>129</sup> Simultaneous engineering also facilitates error detection and correction (discussed below).<sup>130</sup>

#### 4.1.2 Benchmarking.

Benchmarking is the origin of the creative collaborative process: without explicit instructions on how to innovate a solution for a particular problem, firms find an idea of how to proceed by probing possibilities and then building the results of this probing into flexible development plans. Benchmarking is a direct response to the innovation's fundamental uncertainty: because firms cannot clearly identify what to produce at the start of the innovation process, they begin by exploring ideas from peers, customers, past experience, and prototype.<sup>131</sup> It is an experimental, benign form of cribbing.

Benchmarking typically involves two closely related processes: prototyping and searching. In benchmarking by prototype, firms purposefully depart from proven models, develop a range of potential products, and test these potentials, often with consumers.<sup>132</sup> This iterative dialogue, between collaborating firms and/or between collaborators and possible customers, sets the course for production. When firms benchmark through search, they look to industry experience for comparable approaches.<sup>133</sup> This search process may be formal: for example, benchmarking firms can be hired in the IT industry to compare service metrics and pricing structures with industry averages.<sup>134</sup> Once the initial probing has produced results, the innovators then build the results into a general

<sup>128</sup> See, e.g., Glasspiegel, *supra* note 124, at 434 (discussing the importance of “maintain[ing] visibility” in collaborative relationships).

<sup>129</sup> Sabel, *supra* note 120, [Real-time Revolution] at 26 (“[T]he initial overall goals are modified by the methods of simultaneous or concurrent engineering, e.g. the engine-design group may find a way to better its target specifications or to cut its manufacturing costs if it can persuade other component groups that design characteristics should be modified accordingly.”).

<sup>130</sup> *Id.* at 26 (“In just-in-time production, parts are supplied to each work station only as needed: ideally, one at a time. Hence disruptions are immediately visible. A breakdown at one station halts production by stopping the flow of parts to downstream operations.”).

<sup>131</sup> For a discussion of how performance rules are set through recourse to experience outside the immediate collaborative relationship in an IT setting, see Halvey & Melby, *supra* note \_\_, at 421-422 (2005).

<sup>132</sup> For an example of benchmarking by prototype, see Andreas Sennheiser & Matthias Schnetzler, *Lean Benchmarking with Clustered Company Prototypes*, in BUILDING THE KNOWLEDGE ECONOMY: ISSUES, APPLICATIONS, CASE STUDIES 1349 (Paul Cunningham, Miriam Cunningham & Peter Fatelnig eds. 2003).

<sup>133</sup> Sabel & Zeitlin, *supra* note 120, at 12-13. Benchmarking can also include searching the partners' past performance for insight. For instance, Glasspiegel identifies four possible methods of benchmarking: one, comparing performance to current cost (this only works where in-house operations are being outsourced); two, comparing performance with other received bids (this only works in the initial stages of the collaboration); three, comparing performance to the market (classic benchmarking); and four, comparing performance to advisor's experience (this is simply a version of classic benchmarking). Glasspiegel, *supra* note 124, at 431. The basic point remains nonetheless: the fashioning of rules takes place outside of the parties' immediate deliberation.

<sup>134</sup> Sam Collier, *PLI-The Outsourcing Revolution: Some Trends, Issues and Solutions*, in THE OUTSOURCING REVOLUTION: PROTECTING CRITICAL BUSINESS FUNCTIONS USING OUTSOURCING, ASP & WEB SERVICE AGREEMENTS, 681-2 (John F. Delaney & William A. Tanenbaum eds. 2002) (“Benchmarking engages an independent firm to measure charges and performance against prevailing market standards”).

production outline. Production is subdivided, or “chunked,” into its constituencies, and teams are assigned to work out designs, still using benchmarking techniques, for their respective subunits.<sup>135</sup>

As a method of “iterated goal setting,”<sup>136</sup> benchmarking means that collaborators work in a system without clearly defined rules. Furthermore, as it takes place continuously at regular intervals, benchmarking disrupts established expectations.<sup>137</sup> Fluid goals replace static rules. Because the new goals are established outside of the immediate agreement but without further bargaining, these rules are open to change without the parties’ deliberation.<sup>138</sup>

#### 4.1.3 Error Detection and Correction.

Error detection and correction is the process for changing rules that were originally approximated through benchmarking.<sup>139</sup> As noted before, because of the new economy’s rapid pace of change, frequent rule adjustment is required.<sup>140</sup> While explicit renegotiation of contract terms is an option here as in any other type of contract, pragmatic coordination allows for rules to change through their very implementation. I.e. as collaborators continually detect and correct errors in design and production as they perform, they adjust the rules that they are to follow.<sup>141</sup>

This process of changing rules through implementation is best exemplified by the “Five Why’s” of the Toyota production process.<sup>142</sup> When confronted with a malfunction in the production system, producers following Toyoda principles perform “root cause analysis” rather than simply focusing on the error’s immediately proximate cause. This root cause analysis, in simplified form, consists of

the careful, iterative examination of possible sources of remedies of the problem—a process known as the “five-whys.” The answer to the first

<sup>135</sup> Sabel, *supra* note 120, [Real-time Revolution] at 25.

<sup>136</sup> Helper et al., *Pragmatic Collaborations* at 466.

<sup>137</sup> *Id.*

<sup>138</sup> For discussion of the practicalities of using benchmarking as an alternative to deliberation as a change mechanism see John F. Delaney & Ruth Ann Keene, *Outsourcing Transactions: Strategies for Success*, in *OUTSOURCING REVOLUTION 2004: PROTECTING CRITICAL BUSINESS FUNCTIONS*, 44-46 (John F. Delaney & William A. Tanenbaum eds. 2004).

<sup>139</sup> The differentiation between these two categories is stylized. For example, parties often use error detection and correction techniques in the benchmarking process: e.g. one collaboration “reverse engineered the cost structure to identify inefficiencies in the existing operation and billing structure as a tool to lower costs during negotiation.” Rick Nathanson, *Transformational Outsourcing*, in *OUTSOURCING REVOLUTION 2005* 385 (John F. Delaney & William A. Tanenbaum eds. 2005).

<sup>140</sup> See also Ellen G. Ray, *Scope of Services and Service Levels*, in *OUTSOURCING REVOLUTION 2004: PROTECTING CRITICAL BUSINESS FUNCTIONS* 539 (John F. Delaney & William A. Tanenbaum eds. 2004) (“The definitive agreement must include a process for proactively addressing changes to [rules].”).

<sup>141</sup> For example, IT service levels are changed not only through “mutual agreement” but also through “automatic changes... based on continuous improvement.” *Id.* at 552.

<sup>142</sup> For background on the Toyota production process, see Allen Ward, Jeffrey K. Liker, John J. Cristiano & Durward K. Sobek II, *The Second Toyota Paradox: How Delaying Decisions Can Make Better Cars Faster*, 36 *SLOAN MANAGEMENT REVIEW* 43 (1995).

“why” is often based on the easily observable or familiar antecedents to its occurrence. An attempted solution based on this relatively automatic diagnosis is unlikely to be successful for long, because there are other “root” causes that are only uncovered with more “why’s.”<sup>143</sup>

As the firm corrects the error identified using, say, the Five Why’s method, it alters corollary rules of performance without renegotiation—e.g. the firm in the example above redesigns not only the production process (by reallocating maintenance personnel) but also the product itself (by correcting the overheating problem). In sum, rules are fluid both because they are established through the dynamic benchmarking process and because they change through unilateral implementation. Thus, pragmatic collaboration involves an environment of continuous, often unilateral, adaptation.



Sabel and colleagues argue that the combined effect of these mechanisms is a robust if subtle governance system. When used together, these three institutions allow collaborative partners the flexibility necessary to adapt to innovation’s pervasive uncertainties. As the parties learn together, they provide the information necessary for effective monitoring of the collaboration. I.e. in order for the collaboration to realize its potential, the parties must share large amounts of information with each other—this transparency has the beneficial side-effect of also shining light on any potential or real defection from the relationship. In turn, this monitoring makes further learning feasible as collaborators can comfortably rely upon each other, thus leading to mutual growth.<sup>144</sup> Thus, the change endemic to such creative relationships is harnessed through a mix of dynamic rules and flexible enforcement.

#### 4.2 The Contracting of Pragmatic Governance

Contracts taken from a variety of industries corroborate Sabel and colleagues’ argument. This next section details the typical contract terms parties use to establish pragmatic governance mechanisms in their collaboration. These contracts use a variety of novel terms beyond the common delivery, price, specification, assignment, and warranty provisions of, say, a traditional supply contract. In addition to a number of excerpted examples, a case study is presented in order to illustrate how the three categories of pragmatic governance intertwine in a single contract. Finally, descriptive statistics resulting from two preliminary analyses that approach the question of how extensive pragmatic governance is in the general economy are presented.

---

<sup>143</sup> Jean-Paul MacDuffie, *The Road to “Root Cause”: Shop-Floor Problem Solving at Three Auto Assembly Plants*, 43 *MANAGEMENT SCIENCE* 479, 494 (1997); see also Robert M. Finkel, *Crafting Statements of Work and Service Levels*, in *THE OUTSOURCING REVOLUTION 2003: PROTECTING CRITICAL BUSINESS FUNCTIONS* 177 (Delaney, John F. and William A. Tanenbaum, eds. 2003) (“Supplier should be responsible for performing a root cause analysis of failures, including: identifying the cause of the failure, recommending procedures for correcting the failure, correcting the failure, and providing assurance that the failure will not recur.”).

<sup>144</sup> Helper et al., *Pragmatic Collaborations* at 471-3 (discussing how learning by monitoring leads to the control of opportunism).

Before proceeding, a few notices must be given. First, it is important to remember that the categories of simultaneous engineering, benchmarking, and error detection/correction are conceptual—in practice the three categories often bleed into each other. Indeed, benchmarking and error detection/correction are simply two sides of the same coin. The point is that, although creating a typology is analytically useful, the categories somewhat obscure the interconnections between the different mechanisms. Thus, downloading some of the contracts presented here and reading them in their entirety provides the best perspective on how this type of contracting works. Second, this section of the paper primarily serves an evidentiary purpose, which is to substantiate the pragmatic collaboration claim made above and to lay the factual groundwork for later theoretical arguments. In service of this purpose, the evidence here tends toward exhaustiveness: both practitioner literature and actual contracts between collaborators are referenced to make the case. I have tried to balance the need for thoroughness (this article is making a fundamental claim about how the economy works, after all) with the reader's interest in parsimony by using footnotes extensively. That said, I encourage the reader to examine the footnotes, since the material found therein is of importance.

#### 4.2.1 The Stylized Facts of Pragmatic Governance Contracting with Examples from Several Industries

Contracts between collaborators exhibit Helper et al.'s general logic. First, simultaneous engineering terms provide for co-location of the parties employees and an iterated design/manufacturing process. Second, benchmarking terms establish the metrics to be used in benchmarking, incorporate benchmarking into an overarching but flexible production plan, incentivize progress through the benchmarking scheme through milestone remuneration, and include a process for introducing derivative products into the benchmarking system. Finally, error detection/correction terms create an oversight body, establish a reporting system, outline the continual testing required to detect errors, set up the correction regimens that ratchet-up performance, and connect this problem-solving process to the benchmarking system.

*Simultaneous Engineering Terms.* These contracts provide the necessary conditions for simultaneous engineering to occur. First, they provide for the integration of the collaborative efforts of both teams into each other's current operations. For example, a Deere-Stanadyne contract outlined the parameters of an "iterative design process"—i.e. a system of co-design where progress is achieved through a back-and-forth exchange of design modifications.<sup>145</sup> A contract between Cisco and KPMG required that "Cisco shall provide a single point of contact in the field for KPMG representatives to enable real-time field interaction. KPMG shall provide personnel to match up with Cisco's existing Offer Integration Team ("OIT") to prepare joint responses to customer [requests]."<sup>146</sup> The following selection, one segment of an initial research plan for a

---

<sup>145</sup> Deere-Stanadyne contract of 14 Dec 2001 at §X (this contract was found using the LexisNexis EDGARPlus database and is on file with the author).

<sup>146</sup> Cisco, Inc. & KPMG contract of 29 Dec 1999, §4.3 available at <http://contracts.onecle.com/bearingpoint/cisco.collab.1999.12.29.shtml>.

biotechnology collaboration between Coca-Cola Co. and Senomyx, illustrates the close simultaneous cooperation that these contracts establish.<sup>147</sup>

[Coke]	[Research Steering Committee]	[Senomyx]
1. Provide SENOMYX with [***]. 2. Collaborate with SENOMYX to prepare and evaluate [***].	1. Coordinate [***].	1. Prepare [***]. 2. Perform [***] according to agreed [***]. 3. Perform [***] and other relevant tests [***]. 4. Conduct [***] for certain compounds.

This brief plan segment shows not only that the parties were to work simultaneously on the project but also that the research steering committee was to serve as the mechanism coordinating the parties’ joint efforts. To make such cooperation possible, these contracts, secondly, create the necessary proximity, often through co-locating collaborators’ employees. For example, the Apple-SCI contract required that “[u]pon Apple’s request, SCI will locate such test engineer(s) at Apple’s engineering facilities.”<sup>148</sup> A contract between Intel and Phoenix Technologies stipulated that Intel could require Phoenix to locate teams at key Intel facilities.<sup>149</sup> Note, however, that co-location is not the only tool for achieving proximity: collaborators also frequently use advanced IT networks to achieve a similar level of real-time collaboration. For example, the agreement between deCODE, an Icelandic biotech firm, and Massachusetts General Hospital created a customized IT “bridge”—called the “Crosswalk Project”—in order to facilitate collaboration between researchers on two continents.<sup>150</sup> All this allows the collaboration to progress in lock-step fashion.

*Benchmarking Terms.* With the conditions for simultaneous engineering established, these contracts then set out the benchmarking process. With a general benchmarking clause in place,<sup>151</sup> the task then is to determine the specific metrics from which the benchmarking analysis will proceed.<sup>152</sup> For example, a contract between Allstate and Acxiom Corp., an IT outsourcing firm, required that

<sup>147</sup> Senomyx-Coke contract of 22 April 2002, at Appendix B, available at <http://contracts.onecle.com/senomyx/coca-cola.collab.2002.04.22.shtml> (last visited 13 June 2007).

<sup>148</sup> Apple-SCI contract of 31 May 1996 at §5.2, available at <http://contracts.onecle.com/apple/scis.mfg.1996.05.31.shtml> (last visited 13 June 2007).

<sup>149</sup> Intel-Phoenix contract of 18 Dec 1995 at §3.5 (“Intel will have the right to require up to twenty (20) members of the Dedicated Engineering Team to be located at a site or sites, selected by Phoenix, near facilities where Intel’s organization supporting system-level software on Intel Products are located, such location presently being Hillsboro, Oregon.”), available at <http://contracts.onecle.com/phoenix-tech/intel.supply.199512.18.shtml> (last visited 13 June 2007).

<sup>150</sup> deCODE and Massachusetts General Hospital contract of 11 May 2000, §4, available at <http://contracts.onecle.com/decode/partners.saa.2000.05.11.shtml>.

<sup>151</sup> For an example of a simple standard benchmarking clause, see Halvey & Melby, *supra* note 127, at 426.

<sup>152</sup> Finkel, *supra* note 143, at 162; see also Ray, *supra* note 140, at 543 (indicating that “specific performance metrics” from the industry are used to set benchmarks).

the initial MASLs [minimum acceptable service levels] for those Services previously provided under the PSA and not specified in Schedule 4.1 shall be the higher (i.e., the more beneficial to Allstate) of (i) the actual service levels provided immediately prior to the Effective Date or (ii) the MASLs, if any, previously specified for such services under the Prior Agreements. All MASLs shall be subject to adjustment pursuant to this Section 4.<sup>153</sup>

I.e. the MASLs—the initial metrics against which performance would be measured—were set by reference to Acxiom’s performance during the ramp-up period of the current contract or Acxiom’s prior performance in earlier collaborations with Allstate. With the metrics determined, these contracts then locate the benchmarking process within a loose development plan.<sup>154</sup> These plans and targets are usually transformational in design—i.e. their goal is to realize a rapid introduction of new technologies or processes and/or enter a new market.<sup>155</sup> Achieving the plan is incentivized through corresponding remuneration milestones.<sup>156</sup> Finally, these contracts include a procedure for incorporating derivative products, unforeseen at the time of contracting, created during the collaboration into the benchmarking system.<sup>157</sup>

*Error Detection/Correction Terms.* Third, these contracts also define the institutions for error detection and correction. They establish an oversight body, often a committee, which coordinates the parties’ activities and oversees rule adjustments.<sup>158</sup> This committee is typically staffed by an equal number of representatives from each collaborator<sup>159</sup> and is tasked with creating a production plan, setting benchmarks and incentives, and problem-solving.<sup>160</sup> In cases where

<sup>153</sup> Allstate-Acxiom contract of 19 Mar 1999 at §4.1, available at <http://contracts.onecle.com/acxiom/allstate.outsource.1999.03.19.shtml> (last visited 13 June 2007).

<sup>154</sup> Halvey & Melby, *supra* note 127, at 449; Rosemary Gullikson, *Scope of Services and Service Levels: Anatomy of a Statement of Work*, in *OUTSOURCING REVOLUTION 2004: PROTECTING CRITICAL BUSINESS FUNCTIONS* 595 (John F. Delaney and William A. Tanenbaum eds. 2004). For a complete example of an initial research and development plan, too lengthy to reproduce here, see Appendices B and C of the Coke-Senomyx contract, *supra* note 147; *see also* the Apple-SCI contract, *supra* note 148, at §4.1.

<sup>155</sup> Ray, *supra* note 140, at 533. For a more thorough discussion of transformation, *see also* Halvey & Melby, *supra* note 127, at 441-461.

<sup>156</sup> *Id.* at 695. *See also* Ray, *supra* note 140, at 547 (“Service Levels should be designed to incent desired behavior”); *see also* Coke-Senomyx contract, *supra* note 147, at §9.3.

<sup>157</sup> Apple-SCI contract, *supra* note 148, at §4.1 (“The parties may add new Products to this Agreement after the Closing Date by adding Product Plans for such Products, executed by both parties and in the format and containing the information set forth in [the contract].”).

<sup>158</sup> George Kimball, *Governance and Dispute Resolution: Making it Work* in *OUTSOURCING REVOLUTION 2005: PROTECTING CRITICAL BUSINESS FUNCTIONS* 473-475 (John F. Delaney and William A. Tanenbaum eds. 2005).

<sup>159</sup> “[B]oth vendor and customer have an interest in [being sure the vendor delivers the services in accordance with the definitive agreement... [thus] performance [should] be monitored by both parties.” Ray, *supra* note 140, at 540.

<sup>160</sup> *See* Finkel, *supra* note 143, at 170. *See also* Nathanson, *supra* note 139, at 398. For example, the agreement between Coca-Cola and Senomyx provides of such a committee’s responsibilities:

- The Steering Committee will manage the Collaborative R&D Program and will:
- (i) provide strategic direction and performance criteria for the Collaborative R&D Program;
  - (ii) monitor progress and communicate status of the Collaborative R&D Program;

formal committees are not established, managers from each collaborator are designated to jointly oversee the relationship.<sup>161</sup> Also, these contracts create a reporting regimen either between the collaborators and the oversight committee or between the collaborators directly.<sup>162</sup> Most importantly, these contracts oblige collaborators to follow particular error detection and correction techniques, such as root cause analysis,<sup>163</sup> “continuous improvement,”<sup>164</sup> quality “ratchets,”<sup>165</sup> etc.<sup>166</sup> The Deere-Stanadyne contract provides a good example of such techniques: first, Stanadyne was required to pursue “cost reduction activities” that were to be identified using “the John Deere Cost Reduction Opportunity Process, JD CROP”;<sup>167</sup> and second, Stanadyne agreed “to participate in the John Deere Power Systems (“JDPS”) Supplier Development (“SD”) Team Program to reduce cost of products supplied to DEERE.”<sup>168</sup>

#### 4.2.2 Case Study: The Boeing and Spirit Aerosystems Agreements

- 
- (iii) facilitate the cooperation of the parties under the Collaborative R&D Program;
  - (iv) communicate during the Commercialization Period regarding the development of Selected Compound(s) and the commercialization of Beverages and Beverage Bases incorporating Selected Compounds;
  - (v) review and amend if necessary the Research Plan and the Development Plan;
  - (vi) determine which of the Enhancing Compound(s) that KO determines is are commercially viable will be selected for development as Selected Compound(s); and
  - (vii) establish the protocol for determining the enhancement level of Enhancing Compounds, and Selected Compounds, and agree on the level of enhancement of Enhancing Compounds.

Coke-Senomyx contract at §4.2.

<sup>161</sup> See e.g. Nanosys-Matsushita contract of 18 Nov 2002 at §2.3; Apple-SCI contract, supra note 148, at §7.9, available at <http://contracts.onecle.com/nanosys/matsushita.rd.2002.11.18.shtml> (last visited on 13 June 2007); Allstate-Axiom contract, supra note 153, at §9.1.2.

<sup>162</sup> George Kimball, *Metrics and Benchmarking in Outsourcing Deals: Moving the Goal Posts*, in *OUTSOURCING REVOLUTION 2002: PROTECTING CRITICAL BUSINESS FUNCTIONS*, 686 (John F. Delaney and William A. Tanenbaum eds. 2002); Finkel, supra note 143, at 178; see e.g. Apple-SCI contract, supra note 148 at §9.2.

<sup>163</sup> Rosemary Gullickson, *Scope of Services and Service Levels: Anatomy of a Statement of Work—Powerpoint Slides* in *THE OUTSOURCING REVOLUTION 2004: PROTECTING CRITICAL BUSINESS FUNCTIONS* 603 (John F. Delaney & William A. Tanenbaum eds. 2004); Halvey & Melby, supra note 127, at 424; Ray, supra note 140, at 556.

<sup>164</sup> Nathanson, supra note 139, at 392; Finkel, supra note 143, at 170; Ray, supra note 140, at 557.

<sup>165</sup> Kimball, supra note 162, at 694.

<sup>166</sup> There are many other terms for this improvement process. The basic idea is that pragmatic governance mechanism will require the “[v]endor [to] perform on-going performance measurement during the term to identify opportunities for improvement.” Thomas L. Hall & Wanji Walcott, *Outsourcing in the Financial Services Industry: A Mock Negotiation* in *OUTSOURCING REVOLUTION 2004: PROTECTING CRITICAL BUSINESS FUNCTIONS* 847 (John F. Delaney & William A. Tanenbaum eds. 2004).

<sup>167</sup> Deere-Stanadyne contract, supra note 145, at §VIII(B).

<sup>168</sup> *Id.* at §VIII(D).

An agreement between Boeing and Spirit Aerosystems,<sup>169</sup> a supplier of airplane fuselages, wings, and nacelle products, illustrates the three pillars of pragmatic governance in detail.<sup>170</sup> The level of detail found in this contract is not a peculiarity of these two companies; rather, this example of pragmatic governance contracting is exceptionally clear because Spirit Aerosystems filed with the SEC not only a “General Terms Agreement” (“GTA”) between it and Boeing but also a specific “Special Business Provisions” (“SBP”) contract that fell within the framework agreement. The more detailed SBP provides a glimpse into how firms contract the particulars of the pragmatic governance mechanisms they establish in general terms in their overarching framework agreements.

The GTA and SBP established the parameters of a JIT production relationship.<sup>171</sup> The agreements, which included Spirit in the supply chain of the new 787 Dreamliner and other aircraft models,<sup>172</sup> required Spirit to innovate not only new products but also new processes.<sup>173</sup> To govern this innovative collaboration, pragmatic mechanisms were included in the contracts. First, the contracts provided the preconditions for simultaneous engineering. The GTA established that “Boeing may, in its sole discretion and in coordination with Seller, and for such period as Boeing deems necessary, locate resident personnel (Resident Team) at Seller’s facility to assist or support Seller.”<sup>174</sup> The GTA also allowed Boeing to “have unencumbered access to Seller’s facility to operate or assist in operating the facility in order to assure completion of the requirements for the Order.”<sup>175</sup> Furthermore, the SBP included a reciprocal requirement that “Life Cycle Product Teams” from Spirit would be located at Boeing’s facilities.<sup>176</sup> Thus, teams from each party were co-located with each collaborator. The SBP also set up the conditions for an iterated design process: first, the back-and-forth of co-design was described; and second, Spirit was required to have IT systems compatible with Boeing to facilitate real

---

<sup>169</sup> Boeing’s decision to collaborate with Spirit was part of a broad company strategy, centered around the 787 Dreamliner project, to revolutionize the way it designed and produced commercial airplanes. Chris Hayter, *The Network-Centric Innovation Imperative: How Manufacturers Work with Their Suppliers to Develop New Products*, National Council for Advanced Manufacturing Report 61-71 (2006) (discussing the “very different approach” Boeing has been using when designing and manufacturing the 787 Dreamliner).

<sup>170</sup> Both of the agreements between Boeing and Spirit Aerosystems examined in this section were found via the LexisNexis EdgarPlus database. Copies of these contracts are on file with the author.

<sup>171</sup> Boeing-Spirit GTA at §4.1 (“Seller shall not deliver Products prior to the scheduled delivery dates unless authorized by Boeing in writing.”); *see also* Boeing-Spirit SBP at Attachment 19 (setting forth the matrix for lead times and “incremental release” of products).

<sup>172</sup> *See* Boeing-Spirit SBP at §20.2.3 (discussing inventions for the 787); *see also* the Spirit Aerosystems website, available at <http://www.spiritaero.com/tooling.aspx> (discussing the tooling Spirit innovated for use in the 787 program).

<sup>173</sup> *See e.g.* Boeing-Spirit SBP at §3.3.4.2 (“As of the date hereof, [Spirit] is responsible for providing all New Contractor-Use Tooling (as defined in New Tooling) needed to manufacture and deliver Products as required in the performance of this SBP. Seller shall plan, design, manufacture or procure, and test all New Contractor-Use Tooling.”).

<sup>174</sup> Boeing-Spirit GTA at §5.2.

<sup>175</sup> Boeing-Spirit GTA at §13.2(F).

<sup>176</sup> Boeing-Spirit SBP at §3.3.5.

time design collaboration.<sup>177</sup> Thus, the parties established a regimen of simultaneous engineering.

Second, the contract set forth benchmarking terms. The first step in this regard was assessing Spirit's available means for achieving the rough goals envisioned in the contract:

3.3.4.5 INITIAL PLANNING: Seller [i.e. Spirit] will perform all Tooling and production planning activities. Seller shall also prepare, and Boeing shall have the right to review, Tooling and production planning documentation as necessary to evaluate Seller's ability to produce Production Articles....<sup>178</sup>

Next, the results of this initial planning were incorporated into formal "Supplier Specification Plans" for each individual "Production Article" through the use of "Contract Change Notices"—i.e. Spirit could unilaterally alter the specifications for a Production Article where necessary.<sup>179</sup> These adjustments were organized and driven by the overarching Statement of Work, the primary benchmarking device, which established the "Baseline PRR Engineering Thresholds" and gave "summary matrices depicting the Engineering Delegation requirements for each product."<sup>180</sup> These benchmarks were to be ratcheted-up (or down) on a yearly basis:

Each year, an adjustment will be made concurrent with the quantity based price adjustment process outlined within Attachment 20 to establish the appropriate threshold for each program for the following year. To calculate the new threshold, the PRR Engineering Thresholds per Airplane as identified above will be multiplied by [\*\*\*\*\*] (beta factor) times the change in delivery rates by program for the target year vs. 2003 Airplane Deliveries by Program. This value will then be added to (or subtracted from) the Baseline PRR Engineering Thresholds. In other words, the PRR Engineering Threshold for any given year will be increased (or decreased) by [\*\*\*\*\*] of the variation in airplane deliveries by program for that year versus 2003 airplane deliveries.<sup>181</sup>

In order to maintain a consistent production plan in the face of such volatility, the contract also included a "Lead Time Matrix"—such was to allow the parties to accelerate or decelerate related production schedules vis-à-vis changes in a given product.<sup>182</sup> The benchmarking process was incentivized through a milestone system:

---

<sup>177</sup> *Id.* at §12.8 ("Seller shall implement and maintain systems as required to ensure: i) compatibility with Boeing systems; and ii) Seller's performance under this SBP, including, but not limited to, business, manufacturing and engineering systems.")

<sup>178</sup> Boeing-Spirit SBP at §3.3.4.5.

<sup>179</sup> *Id.* at Attachment 2(A) ("The configuration of each Production Article shall be as described in the latest released Supplier Specification Plan (SSP) revision in the Order and/or in the Contract Change Notices.")

<sup>180</sup> *Id.* at Attachment 4(A).

<sup>181</sup> *Id.* (redactions in the original).

<sup>182</sup> *Id.* at Attachment 6.

Timing for non-recurring engineering, product development and test payments for Derivatives shall be tied to specific events as non-recurring effort progresses, which events shall not be limited to first ship set delivery and receipt by Boeing. Schedule of specific events to be mutually agreed upon for each engineering development effort (i.e. 25%, 50%, 90% engineering release).<sup>183</sup>

Finally, the contract made provision for the inclusion of new products developed during the collaboration into the pragmatic governance system.<sup>184</sup>

Third, Boeing and Spirit established a robust error detection/correction system. Although a formal committee was not established, “authorized representatives” were chosen to act as both decisionmakers and liaisons.<sup>185</sup> Furthermore, the contract required that Spirit “will assign a full-time program manager whose exclusive responsibility will be to oversee and manage Seller’s performance.”<sup>186</sup> The heart of the error detection/correction mechanism was a “technical and cost improvement program” in which the partners would collaborate to identify “new technologies and process improvements intended to reduce [Spirit’s] costs or improve product performance.”<sup>187</sup> Another program, the “Total Cost Management System,” tied such improvements to reductions in the overall price of the products Spirit was selling to Boeing.<sup>188</sup> These programs were to apply not only to Spirit and Boeing but also to Spirit’s subcontractors.<sup>189</sup> This was part of a wider effort to further rationalize Boeing’s entire global supply chain.<sup>190</sup> In addition to the cost and performance improvement programs, another scheme required Boeing and Spirit to collaborate in improving production cycle times:

Boeing and Seller acknowledge that Boeing is committed to reduce Cycle Time. Seller agrees to support Boeing in its commitment and to work with Boeing to develop mutually acceptable actions to support Cycle Time requirements as specified by Boeing to support the Program Airplane. Upon Boeing’s request Seller shall submit to Boeing a written plan describing how Seller would comply with the Cycle Time schedules, as specified by Boeing.<sup>191</sup>

---

<sup>183</sup> *Id.* at §5.2.1; *see also* *Id.* at Attachment 4 (establishing which projects would be on the milestone track).

<sup>184</sup> *See e.g. id.* at §4.5 (“Prices for Derivative(s) will be negotiated in good faith based on then-prevailing market conditions appropriate for each Product type.”).

<sup>185</sup> *See e.g. id.* at §3.4.10 (“Seller’s AR as designated and approved by Boeing shall operate and act in accordance with Boeing Document DOA-300064-NM Delegated Option Authorization Procedures Manual... to provid[e] compliance findings to Boeing Delegated Compliance Organization.”).

<sup>186</sup> *Id.* at §12.10.

<sup>187</sup> *Id.* at §7.6.1.

<sup>188</sup> *Id.* at §7.6.

<sup>189</sup> *Id.* at §12.11.

<sup>190</sup> *Id.* at §12.12.1.

<sup>191</sup> *Id.* at §12.7.

Progress through these programs was formally monitored through an extensive reporting system. First, Spirit was required to “provide to Boeing a Product Definition and manufacturing milestone chart identifying the major engineering, purchasing, planning, Tooling and manufacturing operations for the applicable Product(s).”<sup>192</sup> As design and production proceeded, regular “management reviews” to discuss “total cost performance and schedule performance” were to be held.<sup>193</sup> As errors were detected, Spirit was further required to make immediate “problem reports” that contained a “detailed description of the problem, impact on the program or affected tasks, and corrective/remedial action, with a recovery schedule.”<sup>194</sup> In light of the corrective measures identified in such reporting, Spirit was obligated to then “revise and maintain the production planning as required to support the production and certification of Production Articles.”<sup>195</sup> Boeing also had the right to alter the production plan in response to revisions.<sup>196</sup> To accommodate such change, a price-adjustment process was outlined.<sup>197</sup>

Thus, Spirit was pre-authorized to make unilateral changes as long as those changes fell within the remit of the Statement of Work (as found in Attachment 4 to the SBP)—only those changes too radical to be considered within the SOW were required to have written approval from Boeing.<sup>198</sup>

#### 4.2.3 The Broader Picture: A Preliminary Analysis of Pragmatic Governance Contracts across Various Industries

An interesting question, though one not determinative to this article’s argument, is the extent to which pragmatic governance contracting, such as that between Boeing and Spirit Aerosystems, has caught on in the general economy. To approximate an answer to this question, I performed two content analyses. Due to limited resources, these analyses are admittedly rough<sup>199</sup>; however, they are, I believe, suggestive. The first, whose results are found in Tables One through Four, analyzed 17,076 agreements between collaborators from the LexisNexis EdgarPlus™ database.<sup>200</sup> The analysis covered a

<sup>192</sup> *Id.* at §9.2.

<sup>193</sup> *Id.* at §9.3.

<sup>194</sup> *Id.* at §9.4.

<sup>195</sup> *Id.* at §3.4.7.

<sup>196</sup> See *id.* at §6.

<sup>197</sup> *Id.* at §7.9. The formulae for adjusting prices is found in *id.* at Attachment 20.

<sup>198</sup> *Id.* at §24.0.

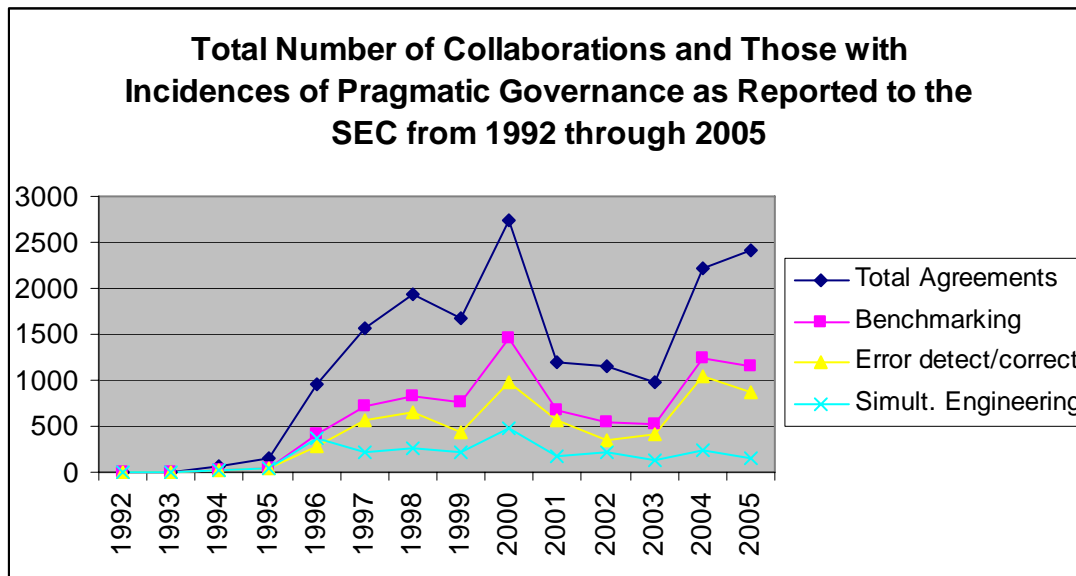
<sup>199</sup> The contracts were analyzed for the following markers: of benchmarking—“milestone or ‘service level’ or benchmark or target or deliverable or deadline or timetable”; of error detection/correction—“committee or ‘program manager’ or ‘contract manager’ or ‘continuous improvement’ or ‘root cause’ or oversee”; and of simultaneous engineering—“joint development’ or ‘joint production’ or ‘joint marketing’ or co-design or co-production or co-authorship or (grant w/s access).”

<sup>200</sup> These agreements were identified through a search for contracts using the most typical titles collaborators affix to their agreements; the specific search in the Lexis EdgarPlus database was “(“collaboration agreement” or “cooperation agreement” or “development agreement” or “development and commercialization agreement” or “framework agreement” or “development and marketing agreement” or “strategic agreement” or “collaborative agreement” or “collaborative research and license agreement” or “collaboration and license agreement” or “cooperative agreement” or “joint activities agreement” or “co-

fourteen year period, from 1/1/1992 through 12/31/2005. The agreements were analyzed for some typical markers of pragmatic governance’s three conceptual categories: simultaneous engineering, benchmarking, and error detection/correction. The results show a slightly positively-sloped secular trend in both the total number of contracted collaborations and the percentage of those contracts using pragmatic governance mechanisms.

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Total Agreements	0	3	64	159	946	1575	1936	1677	2748	1195	1154	983	2216	2420
Benchmarking terms	0	1	30	41	408	720	836	752	1450	671	546	526	1249	1159
Error detect/correct	0	1	26	46	292	560	658	439	988	569	353	405	1044	863
Simultaneous Engineering	0	2	21	51	360	207	269	225	478	164	213	134	233	161

Table One: Large-n analysis of EdgarPlus contracts



Graph of Table One

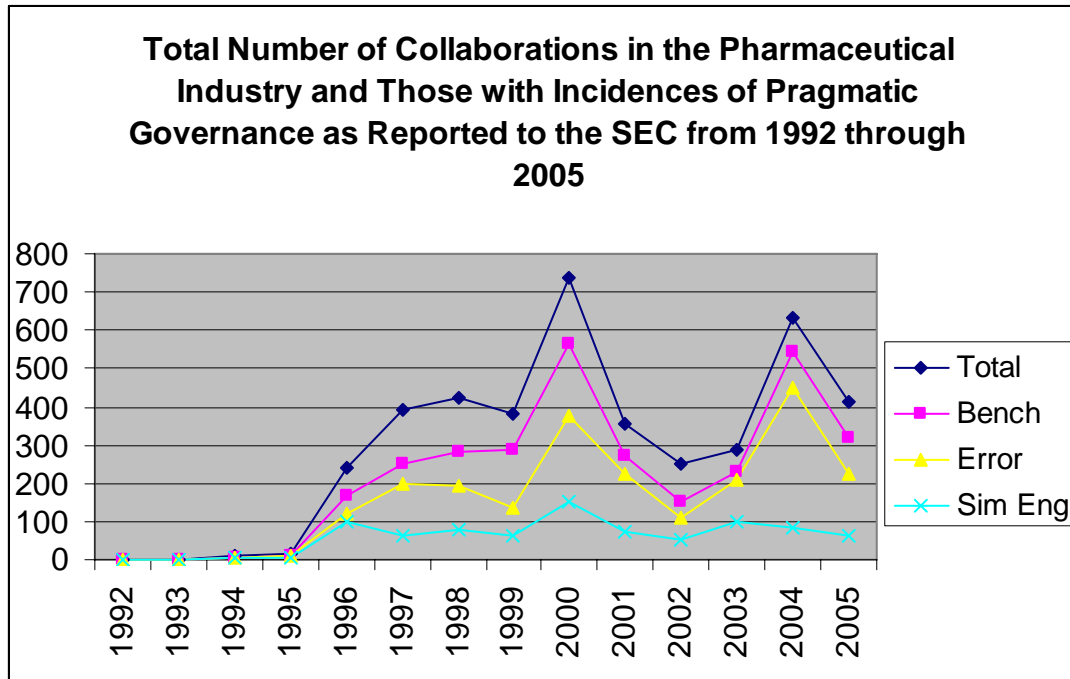
In addition, I conducted the same analysis on a subset of the original sample: 4,139 agreements from 1992 through 2005 between collaborators in the pharmaceutical industry. My hypothesis here was that contracts between “new” economy collaborators, such as firms in the modern pharmaceutical industry, would use pragmatic governance mechanisms more regularly. This hypothesis is borne out in the data:

---

development agreement” or “co-development and license agreement”) and “exhibit 10”) (author’s note: “exhibit 10” is the exhibit number for material contracts).

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Total Agreements	0	0	9	14	240	394	424	384	736	356	252	288	631	411
Benchmarking Terms	0	0	7	9	169	252	283	289	566	272	154	228	545	318
Error detect/correct	0	0	7	9	121	200	192	137	374	224	112	209	451	225
Simultaneous Engineering	0	0	3	7	97	65	79	63	151	72	50	100	83	65

Table Two: Analysis of Collaborations in the Pharmaceutical Industry



Graph of Table Two

The higher incidence of pragmatic governance in pharmaceutical collaborations is readily apparent when one compares the following two tables, which show how many contracts used pragmatic governance as a proportion of the two respective samples. The first table shows the proportion of contracts that used pragmatic governance mechanisms when I searched the entire EdgarPlus database irrespective of industry. The ten-year average (1/1/1996 to 12/31/2005) for these agreements: 49.1% had benchmarking terms, 36.5% had error detection/correction terms, and 15.9% had simultaneous engineering terms. The second table shows the proportion of contracts from the pharmaceutical industry that used pragmatic governance mechanisms. The ten-year average for this sub-group: 73.4% had benchmarking terms, 53.9% had error detection/correction terms, and 21.6% had simultaneous engineering terms. Thus, we find a markedly higher incidence of pragmatic governance when we focus solely on a “new” economy industry. In order to put these results in perspective, I also analyzed 2,805 asset purchase agreements. The average use of pragmatic governance for this control group: 29.9% had benchmarking terms, 24.2% had error detection/correction terms, and 12.9% had simultaneous engineering terms. Thus, the general collaboration sample used pragmatic governance mechanisms about

twice as often as the control group; this ratio increased to approximately 3:1 between the pharmaceutical sample and the control group.

General	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Benchmarking terms	0	33.3	46.9	25.8	43.1	45.7	43.2	44.8	52.8	56.2	47.3	53.5	56.4	47.9
Error detect/correct	0	66.7	40.6	28.9	30.9	35.6	34	26.2	36	47.6	30.5	41.2	47.1	35.7
Simultaneous Engineering	0	66.7	32.8	32.1	38.1	13.1	13.9	13.4	17.4	13.7	18.5	13.6	10.5	6.65

Table Three: Proportion of Agreements Irrespective of Industry that Use Pragmatic Governance Mechanisms

Pharmaceuticals	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Benchmarking terms	0	0	77.8	64.3	70.4	64	66.7	75.3	76.9	76.4	61.1	79.2	86.4	77.4
Error detect/correct	0	0	77.8	64.3	50.4	50.8	45.3	35.7	50.8	62.9	44.4	72.6	71.5	54.7
Simultaneous Engineering	0	0	33.3	50	40.4	16.5	18.6	16.4	20.5	20.2	19.8	34.7	13.2	15.8

Table Four: Proportion of Agreements in the Pharmaceutical Industry that Use Pragmatic Governance Mechanisms

Due to the simplicity of the content analysis used here, it is almost certain that the results here underreport the incidence of pragmatic governance mechanisms. This is because the search, which was confined to a limited number of terms, could not pick up on all the idiosyncratic language parties employ to define their pragmatic governance mechanisms.<sup>201</sup> Therefore, when interpreting the results, it is most important to notice the relative differences between the collaboration agreement results and the control group—the lower percentages in the control group suggest that the results here at least pass some basic threshold of reliability.

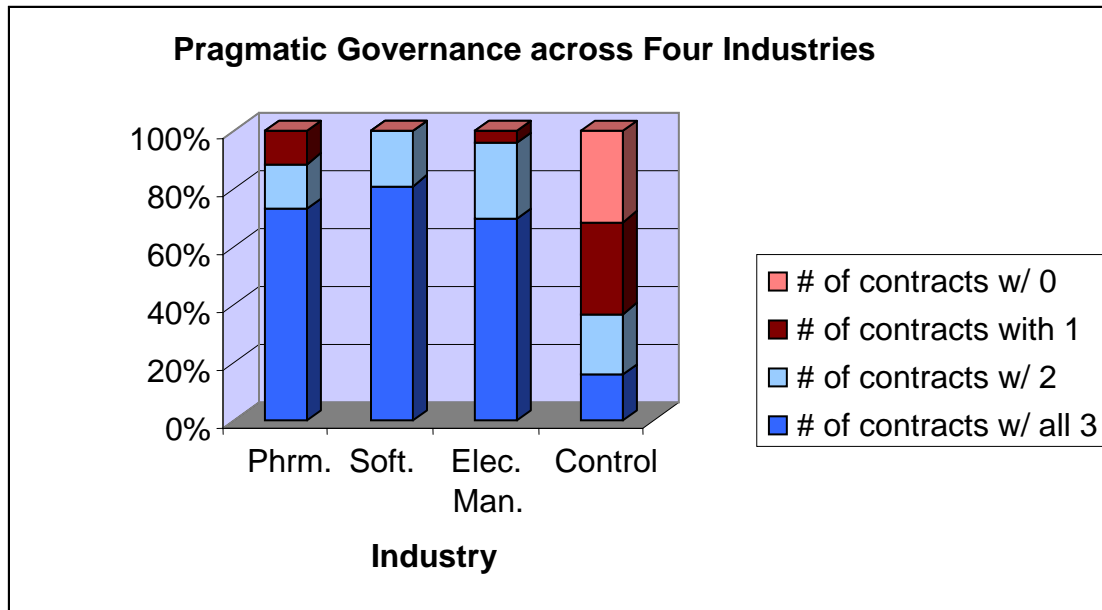
Because of the objective content analysis’ imprecision, a small-n subjective analysis was performed. I analyzed collaboration agreements from the [www.onecle.com](http://www.onecle.com) database. Three “new economy” industries were chosen for the analysis, along with a control group of contracts from “old” industries.<sup>202</sup> However, in addition to a simple search, I also read the contracts in their entirety in order to pick up on language idiosyncrasy. Although subjective, such an analysis allows for a far more nuanced interpretation of the contracts: The results, which give how many of the pragmatic governance categories were found in each contract analyzed, are presented in Table Two and its accompanying graph below.

<sup>201</sup> For example, what one contract calls “continuous improvement” another calls “total quality improvement,” etc.

<sup>202</sup> The “old” economy industries varied, for example, from glass bottle manufacturing to mining.

Industry	Sample size	# of contracts w/ 3 categories	# of contracts w/ 2 categories	# of contracts with 1 category	# of contracts w/ 0 categories
Pharma R&D	27	19 (70.00%)	5 (18.52%)	3 (11.11%)	0
Software Dev.	21	17 (80.95%)	4 (19.05%)	0	0
Electronic Manufacturing	25	16 (64.00%)	6 (24.00%)	1 (4.00%)	0
Control group	20	3 (15.00%)	4 (20.00%)	6 (30.00%)	6 (30.00%)

Table Two: Small-n analysis of www.onecle.com contracts



These results reveal that a majority of the sampled contracts from the three “new economy” industries used pragmatic governance mechanisms. Of course, one can criticize the analysis for its subjectivity and the small sample sizes. However, again, the results for the control group indicate that this analysis has some measure of fidelity. When both the objective large-n analysis and the subjective small-n analysis are considered together, they suggest that there is a general trend, especially in highly collaborative “new” economy industries, towards the adoption of pragmatic governance mechanisms.

### 4.3 Re-conceptualizing Contract Design

How are we to understand these new types of contract terms? In this section, I argue that understanding the contracts discussed above requires a new conception of contract design that I consider a learning theory of contract.<sup>203</sup>

Although fashioning a positive theory of the contracting behavior observed here is my primary goal, it is important to note that the reach of this section is not limited to providing an understanding of the private bar's obvious yet unarticulated creativity. Rather, this learning theory of contract design allows us to envision the institutional support this young and frequently unstable new economic organization—the network—requires. There is more at stake here than abstract theoretical debate.

#### 4.3.1 Revisiting Agency Theory

At first glance, the agency theory of how incomplete contracts are governed provides a convincing explanation for some of the elements found in pragmatic governance. From the agency perspective, benchmarking and error-detection/correction rules can be understood as flexible performance standards. Co-location, the use of project committees, and reporting systems can be seen as methods for monitoring parties' efforts to meet those changing standards. In other words, pragmatic governance simply looks like the latest example of an old story.

However, a closer look leaves significant questions unanswered. First, why would a party contractually require its collaborator to unilaterally change the performance standard? There are two prongs to this question: (1) how can the ability to unilaterally change the standard motivate the agent to maximize the principal's interest; and (2) if unilateral change can somehow be interpreted to motivate the agent, what motivation does the error detection/correction mechanism add to a best efforts clause and corresponding monitoring mechanism?<sup>204</sup> I find it hard to see how requiring an agent to follow a problem-solving process which is unilaterally defined and administered creates an incentive to maximize the principal's interest. Furthermore, there are a number of ancillary questions: Second, why do purchasers require their sub-contractors to co-locate teams at their own facilities? For instance, Boeing required Spirit to send a team to work at Boeing's plant.<sup>205</sup> If monitoring is the sole purpose of co-location, then only placing a Boeing team in Spirit's plant (1) seems sufficient to monitor (indeed, being in a position to observe Spirit's entire plant seems far more advantageous than monitoring a small Spirit team at Boeing's plant for signs of defection) and (2) does not expose Boeing to

---

<sup>203</sup> Learning's role in contracting behavior has been explored before; for a concise survey of the literature, see Smith & King, *supra* note 18, at 29-33. My approach here is different, however, in that (1) it conceives of the contract as the institutionalization of a cooperative learning system and (2) it allows for learning to be not only an end in itself but also a means for achieving other goals (such as constraining opportunism). Other learning theories typically consider contracts as part of a wider learning process: i.e. contracts routinize the lessons which firms have learned through experience. *Id.* at 31

<sup>204</sup> See e.g. Boeing-Spirit contract, Attachment 10, §2.4 (describing procedures for Spirit to unilaterally make "changes to [the] quality system" that Boeing required Spirit's products to pass through).

<sup>205</sup> Boeing-Spirit GTA at §5.2.

either Spirit's monitoring or to the risk that Spirit might appropriate Boeing's intellectual property. Third, why do these contracts' error reporting mechanisms require the parties not only to disclose the error and recalibrate delivery time but also describe in detail the nature of the problem and explain how the solution will impact the product's future development? In other words, why are the parties required to make both the design process and the resulting definition of the product(s) so explicit? Obviously, sharing this information is necessary for the collaboration to progress; however, why do the parties find it necessary to contract something that seems to require so little motivation? Do we really think a party is going to willingly sabotage the collaboration by refusing to disclose the product's very design and definition? Fourth, why are joint committees or project managers *required* to perform coordinating functions in addition to oversight activities? How does coordination impact motivation? Furthermore, why are joint committees often governed by rules of unanimity? Although unanimity rules have been shown to foster commitment to a joint project among participants,<sup>206</sup> the theory explaining this commitment is not principal-agent but a sociologically-inspired theory that consensual decisionmaking leads to greater buy-in among participants. Considering the high cost involved in negotiating these contracts (i.e. pragmatic governance mechanisms are not included in contracts superfluously), a clear explanation for the function of these terms must exist.

#### 4.3.2 A New Theory of Contract Design: Generative Contracting

In this section, I argue that a convincing explanation of these contracts' function can be found if one looks beyond those theories of contractual control discussed above. Of course, monitoring, decision rights, and social norms must matter to some extent in governing deverticalization: the new economy is still a collection of socially-embedded markets driven by future expectations. However, as shown above, much of the contracting behavior we see between collaborators does not easily reflect the outstanding explanations. Therefore, I argue these contracts embrace a different logic.

The logic animating these contracts can be summarized as follows: pragmatic governance mechanisms are responses to the collaborators' need to learn about what it is they are actually doing. This is not simply a problem of information asymmetry. Rather, the ignorance involved here arises from innovation itself: as the collaborators jointly abandon convention and move into a novel production environment, both parties have equal trouble interpreting how new developments impact their respective self-interests. I.e. collaborators experience uncertainty—which has been created by their own purposeful actions and not by events external to the relationship—that is endogenous to the relationship. In such a situation, the imperative is not to prevent defection (the parties will have trouble determining when it is in their self-interest to defect) but to promote joint learning. Pragmatic governance mechanisms are, thus, institutions that systematize this learning process. This systematization not only promotes learning but also aligns the parties' interests: as the collaborators' learn together about what possible outcomes can result from their joint efforts, their self-interests converge accordingly.

---

<sup>206</sup> See generally Dorothy Heisenberg, *The Institution of 'Consensus' in the European Union: Formal versus Informal Decisionmaking in the Council*, 44 EUROPEAN J. OF POLITICAL RESEARCH 65 (2005).

#### 4.3.2.1 The Limits of Current Explanations in the Face of Uncertainty

As noted above, the principal-agent governance system works only if it is apparent to both parties what “best efforts” actually involves in a given set of circumstances. In many cases, such is unproblematic. For example, the gardener tasked with giving his best efforts to keep a yard tidy knows that he is expected to more or less clear a limb that has unexpectedly fallen on the property. The contractual problem is to bind the gardener to a level of performance that meets the owner’s expectations and, thus, maximize the relationship’s joint net product.

However, a situation may arise where the parties are unable to calculate what “best efforts” would really entail.<sup>207</sup> The simple babysitter example used above can illustrate this problem. One can imagine situations (especially if a unique or creative toddler is involved) where the babysitter and/or the parents are unable to determine with any clarity what “best efforts” entails. For instance, assume not only that the child begins crying but also that the situation is one that is novel to both the babysitter and the parents—say, the child is truly inconsolable for the duration of the evening.<sup>208</sup> Imagine that the babysitter tries every trick in his/her book to console the crying child, but to no avail. After much effort, the babysitter shrugs his/her shoulders and resigns to let the kid cry it out for the remainder of the evening even though this will result in a reduced payoff (the parents will be alarmed that their child, who has screamed for the entire evening, now is hoarse and appears traumatized). The limit in such a situation is not that the babysitter lacks the incentives to perform in a manner that meets the parents’ expectations; rather, it is that the babysitter lacks the information she needs to understand the situation and troubleshoot. This informational problem is not a simple matter of asymmetry: the parents do not have the information the babysitter needs to address the problem (e.g. this is the first time the parent’s have ever had their child behave so, this is the first time they have hired a babysitter, the parents are inept, etc.). Achieving “best efforts” here is a learning problem, not a motivational one. Incentives are necessary, of course, or there would be no reason to learn; however, where the problem is relationship-specific learning, incentives alone are insufficient to overcome ignorance. In other words, the problem is that the principal wants the agent to exert “right efforts”—as in those efforts that appropriately diagnose and address the problem—not just “best efforts.”<sup>209</sup>

<sup>207</sup> Goetz and Scott allude to this issue. Goetz & Scott, *supra* note 43, at 1114 (“In any specific fact situation, some retreat from the rigorous definition suggested above [that parties produce to maximize the relationship’s joint net product] may be entirely appropriate. For instance, the duty of the best efforts promisor to take into consideration the other party’s interests should be limited by the promisor’s reasonable ability to foresee the extent of those interests.”). However, Goetz and Scott do not suggest how their theory of relational contracting can address such situations of uncertainty; rather, they argue that a court enforcing the contract should not hold the ignorant party to a strict best efforts standard. *Id.*

<sup>208</sup> Assume that the parents could not foresee this when the contract was drafted.

<sup>209</sup> I am indebted to Josh Whitford for sharing in conversation this idea of the distinction between “best efforts” and “right efforts.” The term “right efforts” is his.

The GHM and BGM approaches have the same type of limits. In the GHM model, governance breaks down if the ex post negotiations are non-contractible. But such non-contractibility is exactly what arises where neither the babysitter nor the parents have the information they need to understand the problem. I.e. if the parties cannot accurately anticipate what will be renegotiated, they cannot efficiently allocate decision rights. In the BGM model, governance breaks down in the face of uncertainty because the party with the control right is unable to calculate  $d^{ic}$ —the optimal relational decision. For example, if the babysitter has the control right, she simply is unable to determine—and the parents are unable to tell her—what the optimal decision is. This also means that  $R_i$ —the renegeing temptation—is not calculable: the parties do not know the situation in which the parties will be tempted to renege. Thus, in situations of high uncertainty, where learning is required to make sense of the parties' interests, these models are unresponsive. Of course, the question arises: how common are situations of such intense uncertainty?

#### 4.3.2.2 Endogenous Uncertainty and the Role of Learning in Contract Design

When one considers the traits of the new economy,<sup>210</sup> one recognizes that problems of joint ignorance abound. In contemporary markets, growth vis-à-vis competitors depends upon a firm's ability to generate new business lines.<sup>211</sup> Thus, firms continuously innovate. Innovation is awash in uncertainty,<sup>212</sup> and including an outside party in the innovation process only complicates an already complex situation. Of course, uncertainty has long been the focus of economic theory. Uncertainty is after all the fount of opportunism that gives parties, ever guileful, opportunity to take advantage of their collaborator's ignorance.<sup>213</sup> However, the standard account of uncertainty overlooks a qualitatively different type of uncertainty that exists when groups attempt cooperative innovation.

*Innovation and Uncertainty.* Parties do not begin their collaboration with a blueprint established ex ante. Rather, “the final product begins as a more or less inchoate and only partially defined idea.”<sup>214</sup> Thus innovation involves what has been called “purposive experimentation.”<sup>215</sup> Because it takes place between a number of firms and involves process and not just product change, this experimentation is an affair that lasts the duration of the collaboration (i.e. experimentation is not simply a brief ramp-up period to define “specs”). The result is that “relationships define products,” not the other

<sup>210</sup> See supra notes 22 through 38 and accompanying text.

<sup>211</sup> CLAYTON CHRISTENSEN & MICHAEL RAYNOR, *THE INNOVATOR'S SOLUTION: CREATING AND SUSTAINING SUCCESSFUL GROWTH* 1-4 (2003) (discussing the “growth imperative”).

<sup>212</sup> Teece, supra note \_\_, at 194 (“Innovation is a quest into the unknown. It involves searching and the probing and reprobating of technological as well as market opportunities. With hindsight, much effort is spent traveling down blind alleys. Serendipity and luck play an important role.”).

<sup>213</sup> Oliver Williamson, *Calculativeness, Trust, and Economic Organization*, 36 *J. OF LAW AND ECONOMICS* 453, 458 (1993).

<sup>214</sup> Whitford, *New Old Economy* at 93.

<sup>215</sup> Pavitt, supra note 28, at 88.

way around.<sup>216</sup> Furthermore, this experimentation means that innovation processes are contingent<sup>217</sup>—i.e. every innovative endeavor is a foray into the unknown. Such novelty makes the meaning of innovators' own activities uncertain: firms “cannot accurately predict the technical and commercial outcomes of their own innovative activities, nor those of other firms” and “rarely are capable of defining the full array of possible uses that may emerge for their innovations, especially radical ones.”<sup>218</sup>

In such situations, parties are uncertain as to how to interpret their own activities vis-à-vis their pre-existing self-interests. In other words, they face uncertainty that is endogenous to their cooperation—their own behavior creates the uncertainty and, thus, cannot be used as a tool with which to interpret the uncertain situation. This is to be contrasted with uncertainty exogenous to the party: in such situations, where the source of the uncertainty is external to the actor, the actor can use the activity that she was going to perform had the contingency not occurred as a baseline against which to judge the new situation. For example, if a lawyer, who intends to take a car service from her midtown office to the federal courthouse in downtown Manhattan because she knows from experience that the trip only takes 10 minutes, suddenly finds the FDR traffic-jammed, she can use the 10 minute outcome of her original plan as the criterion for judging alternatives. Depending upon how they measure up against the original plan's 10-minute outcome, she may ask the driver to take a different street or may even take the subway. Under endogenous uncertainty, however, the party can judge new developments only against the vaguely-conceived goal that motivated the innovation in the first place. For example, the industrial designer, who is trying to create a new computer design, does not have any concrete parallel alternatives against which to compare her drafts. Of course, she can compare the design to existing models, but old designs are not really alternatives: they are being replaced, after all, due to their increasing mediocrity. She can also compare her design against other prototypes on which she or her colleagues are working; however, these are no more certain than her own draft. Thus, the designer is left with only the vague goal of creating something new that will sell well. Furthermore, and perhaps most importantly, discovery of new opportunities often call that vaguely-conceived goal into question.<sup>219</sup> For instance, the designer may come upon an entirely new use for a product as she works on a current design.<sup>220</sup> This fundamental reconception will shift whatever pre-existing notions there were about the potential target market, the complementary software, the possible production costs, etc. In summary, when ends are myopic, parties have little with which to judge available means; and, indeed, experimentation may alter as much as focus the very ends that originally drove the endeavor.

---

<sup>216</sup> Whitford, *New Old Economy* at 93.

<sup>217</sup> Pavitt, *supra* note 28, at 87.

<sup>218</sup> *Id.* at 100.

<sup>219</sup> See Josh Whitford, *Pragmatism and the Untenable Dualism of Means and Ends: Why Rational Choice Theory does not Deserve Paradigmatic Privilege*, 31 *THEORY AND SOCIETY* 325, 337 (2002) (“The oft-cited dualism between means and ends is not tenable. An end, or effect, soon becomes a means, or cause, for what follows.”) (internal citations omitted).

<sup>220</sup> See generally ROBERT D. AUSTIN & LEE DEVIN, *ARTFUL MAKING: WHAT MANAGERS NEED TO KNOW ABOUT HOW ARTISTS WORK* (2003).

Frank Knight's theory of uncertainty provides the groundwork for what I mean by "endogenous uncertainty."<sup>221</sup> From Knight's perspective, we would say that innovating removes the parties' activities from the reach of any meaningful heuristics that might be used to compare the characteristics of future outcomes and that, without those characteristics, it becomes impossible to calculate probabilities for those future outcomes. A brief examination of Knight's theory of uncertainty will reveal what this means.

Knight described the method actors employ to make business decisions in the face of uncertainty as follows:

There are two fundamentally different ways of arriving at the probability judgment [needed to make a decision]. The first method is by a priori calculation, and is applicable to and used in games of chance. This is also the type of case usually assumed in logical and mathematical games of chance. It must be strongly contrasted with the very different type of problem in which calculation is impossible and the result is reached by the empirical method of applying statistics to actual instances.... [T]he first, mathematical or a priori, type of probability is practically never met with in business, while the second is extremely common.<sup>222</sup>

The difference in calculation Knight describes above provides the foundation for what has been understood to be his classic differentiation between risk and uncertainty: risk being measurable, uncertainty being immeasurable.<sup>223</sup> Knight pins our hopes of making a reliable estimation on our chances of "securing the same degree of homogeneity in the instances classed together."<sup>224</sup> In other words, we can make more reliable estimations, and thus approach probabilistic calculation, where we can find larger sample sizes of similar occurrences. It is important to notice, however, what economists have largely

---

<sup>221</sup> While I cast my idea of endogenous uncertainty in Knight's terms, it can also be understood as a restatement of the idea that preferences are endogenous. The theory of endogenous preferences argues that, contrary to standard economic thought which assumes that the ends which agents prefer are stable, agents can rationally deliberate over the ends of their action. In other words, preferences are not exogenously fixed. See Martha Nussbaum, *Flawed Foundations: A Philosophical Critique of (A Particular Type of) Economics*, 64 U. OF CHI. L. REV. 1207-9 (1997); see also Richard Langlois, *Internal Organization in a Dynamic Context: Some Theoretical Considerations*, in COMMUNICATION AND INFORMATION ECONOMICS: NEW PERSPECTIVES 23, 33-38 (Meheroo Jussawalla & Helene Ebenfeld, eds., 1984) (differentiating between "structural" and "parametric" uncertainty). My theory is also similar to the idea that there are "external" and "internal" sources of uncertainty. Daniel Kahneman & Amos Tversky, *Variants of Uncertainty*, 11 COGNITION 143, 149 (1982) (arguing that there are "two loci to which uncertainty can be attributed: the external world and our state of knowledge"). I did not adopt their external/internal language outright because I wanted to stress the role actors' creative efforts play in causing uncertainty.

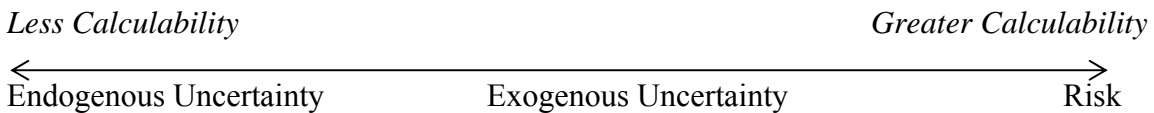
<sup>222</sup> FRANK KNIGHT, RISK, UNCERTAINTY AND PROFIT 214-5 (1921).

<sup>223</sup> *Id.* at 229 ("The practical difference between the two categories, risk and uncertainty, is that in the former the distribution of the outcome in a group of instances is known (either through calculation a priori or from statistics of past experience), while in the case of uncertainty this is not true, the reason being in general that it is impossible to form a group of instances, because the situation dealt with is in a high degree unique.").

<sup>224</sup> *Id.* at 216.

overlooked.<sup>225</sup> that a precondition for making probabilistic calculations is having the ability to classify outcomes in the first place.<sup>226</sup> Where there is “no valid basis of any kind for classifying instances,” however, one can only rely upon guesswork.<sup>227</sup> Innovation is clearly such an instance, since the creative process, as it introduces heterogeneity into a class of heretofore similar experiences, challenges parties’ ability to draw even the simplest conclusions about the characteristics of future outcomes.

From this perspective, standard economic contracting models are incomplete. Theorists’ attempts to model decisionmaking under uncertainty assume that possible outcomes are known—it is only the probabilities of those outcomes that are unknown.<sup>228</sup> This conception should be amended to include the following: a situation when even the possible outcomes are not defined, these outcomes not being clearly known because they have not yet been created. (The common occurrence of innovations being designed with a particular purpose in view but being used eventually for very different purposes<sup>229</sup> reflects this inability of imagination to foresee possible outcomes with meaningful clarity.) So, for example, parties hoping to initiate a new biotech collaboration can sit down at a table with the view of jointly innovating a new protein; however, they cannot describe (1) the characteristics of that molecule in a sufficiently clear manner to compare it with existing proteins, (2) the means that will be used to create the new molecule, and (3) the characteristics of any derivative molecules that might be discovered during the creative process. Of course, as the collaboration proceeds, these characteristics will come into focus. Thus, it is possible to present these three types of contingency—endogenous uncertainty, exogenous uncertainty, and risk—on a continuum:



<sup>225</sup> Richard N. Langlois & Metin M. Cosgel, *Frank Knight on Risk, Uncertainty, and the Firm: A New Interpretation*, 31 *ECONOMIC INQUIRY* 456, 458 (1993) (“It is our contention that [the] received interpretations [of Knight’s work] are flat-out wrong. And, although the newer interpretations... are considerable improvements, they too are incomplete. The reason, we argue, is that interpreting Knight solely in terms of moral hazard and adverse selection narrowly understood is to write the same kind of Whig history that underlies the received views.”)(internal citations omitted).

<sup>226</sup> *Id.* at 459 (“Knight’s main concern was about the possibility of classifying the ‘states of nature.’ ‘When our ignorance of the future is only partial ignorance, incomplete knowledge and imperfect inference,’ he says, ‘it becomes impossible to classify instances objectively.’ The point is not so much that we do not know probabilities as that we do not know the classification of outcomes.”)(internal citations omitted).

<sup>227</sup> Knight, *supra* note 222, at 225. Thus, Knight speaks of making an estimate of an estimate. *Id.* at 227 (“A man may act upon an estimate of the chance that his estimate of the chance of an event is a correct estimate.”).

<sup>228</sup> JAMES BERGIN, *MICROECONOMIC THEORY: A CONCISE COURSE* 14 (2005) (“it is assumed that the decisionmaker can identify the possible states of the world and how actions relate to outcomes or consequences, but no objective probabilities are assigned to states.”). *See also* Jens Beckert, *What is Sociological about Economic Sociology? Uncertainty and the Embeddedness of Economic Action*, 25 *THEORY AND SOCIETY* 803, 813 (1996) (“[to preserve] the rational-actor model... situations of uncertainty are reinterpreted as situations of risk—in the sense of Knight’s distinction—in that the individual has information on which to base probability calculations.”).

<sup>229</sup> *See* Pavitt, *supra* note 28.

Note, however, that additional endogenous uncertainties will arise as the innovation proceeds even as prior uncertainties are resolved. Thus, collaborators are constantly re-immersed in situations of endogenous uncertainty.

To summarize the argument so far: as the innovators jointly abandon convention, they enter a fundamental state of uncertainty in reference to their own respective interests. I.e. even if all probabilities exogenous to the collaborators were held constant, the collaborators would still have to cope with not knowing what steps they are going to take to realize the vague goals they have set for the collaboration. Innovation causes such endogenous uncertainty by removing the innovators from their existing framework—the routines, conventional wisdom, and common heuristics—they formerly used to direct their decisionmaking. Innovation decontextualizes economic planning. Thus, parties to an innovative collaboration find it difficult to say with any certainty what course of action it should take because, without pre-determined plans, they cannot predict, much less judge, the possible outcomes resulting from any available decision option.

a. Contract as Modular Learning System.

Endogenous uncertainty poses an acute learning problem for collaborators: realizing the promise of the collaboration requires experimentation in order to discover what that potential actually is. As Helper et al. note, “interlocutors and partners must cooperate in pursuit of mutual intelligibility as a condition for self-understanding.”<sup>230</sup> Pragmatic governance is the systematization of this joint learning process:

‘[P]ragmatic mechanisms’ [are] disciplines that reveal the ambiguities of current product designs, production processes, and organizational boundaries. At the same time, they orchestrate joint inquiry, among collaborating individuals, groups and organizations, of these ambiguities.<sup>231</sup>

Thus, as collaborators repeatedly work through the benchmarking, simultaneous engineering, and error detection/correction process, they learn the characteristics and utilities of their innovations and, thus, are able to begin constructing appropriate strategies. In this manner, endogenous uncertainty resolves.<sup>232</sup> Of course, as the parties

<sup>230</sup> Helper et al., *Pragmatic Collaborations* at 445. There is a subtle difference between this paper’s conceptualization of pragmatic governance’s function and the function Helper et al. present. Helper et al. argue that the motivation for pragmatic governance arises from human’s innate “sociability” and proclivity for reciprocity. *Id.* Here, however, pragmatic governance is presented as an answer to uncertainty, which is a conception that accommodates the standard view of guileful economic actors who threaten to undermine economic cooperation with self-interested behavior. My conceptualization does not contradict Helper et al.; however, it is noteworthy that my theory does not depend upon a particular view of human nature.

<sup>231</sup> *Id.* at 446.

<sup>232</sup> It is important to note, though outside the scope of this paper, that this is a *rational* process. Experimentation is not synonymous with irrationality. Experimentation does, however, require a different understanding of actor rationality than what typical economic theory offers. Whereas economic theory presupposes an actor making choices on preferences determined a priori, the idea of rationality here allows for those preferences to emerge *within* the experimentation process. This conception of actor self-interest

continue to innovate, new endogenous uncertainties emerge, requiring a continuous learning process.

The *contracting* of pragmatic governance is then understood as the formalization of this learning process.<sup>233</sup> To use terminology that originated in computer science: the contract allows for the “modularization” of the learning process.<sup>234</sup> “Modularization” refers to a strategy for managing the development of complex systems:<sup>235</sup> the idea is to decompose a complex system into manageable, independently-designed sub-units.<sup>236</sup> Entropy within the decomposed system is avoided through a common architecture of “design rules”—i.e. rules that determine how the various sub-units communicate with each other within the overarching design of the system.<sup>237</sup> Baldwin and Clark provide two characteristics of design rules pertinent to our discussion here: first, design rules provide an *architecture*, which indicates what modules will be part of the system and what their functions will be,<sup>238</sup> second, design rules provide *interfaces* that describe how the modules will interact, i.e. how they will work together and communicate.<sup>239</sup> The contracting of pragmatic governance provides both architecture—it establishes the various sub-systems that make up the pragmatic coordination process—and interfaces—it

---

is akin to what Henry Waldgrave Stuart described nearly a century ago as the indeterminacy of our “constructive or progressive or creative interest.” Henry Waldgrave Stuart, *The Phases of the Economic Interest* in CREATIVE INTELLIGENCE: ESSAYS IN THE PRAGMATIC ATTITUDE 282 (John Dewey ed. 1917). Criticizing accounts that gave actors “dormant or implicit desire,” Stuart argued that an actor when “embarking upon a new interest... [has a motive that] is neither more nor less than a supposition, on the agent’s part, that there may be forthcoming for him in the given case in hand just such an ‘epigenetic’ development of new significance and value as we have found actual history to disclose as a normal result of economic innovation.” *Id.* at 299. The epistemic foundation for such a conception of rationality can be found in the philosophy of American Pragmatists such as Dewey, Peirce, and James. See Whitford, *supra* note 220, at 325.

<sup>233</sup> Some support for this claim can be found in Holmström and Robert’s argument that some contractual provisions are not directed at hold-up issues but are for matters of “knowledge transfer.” Holmström & Roberts, *supra* note 12, at 90-1. Note, however, that their discussion was focused on the spillover of potentially valuable ideas to third parties.

<sup>234</sup> The term “modularization” is used self-consciously here; those familiar with the debate between modular versus pragmatic production coordination will likely find it ironical (or confounding). See generally Richard Langlois, *Modularity in Technology and Organization*, 49 J. OF ECONOMIC BEHAVIOR AND ORG. 19 (2000); see also Sturgeon, *supra* note 27; cf. Sabel & Zeitlin, *supra* note 120. Although this paper’s evidence clearly supports the pragmatic theory of organization, such does not preclude the application of modularity’s insights *within* pragmatic governance.

<sup>235</sup> Carliss Y. Baldwin & Kim B. Clark, *Managing in an Age of Modularity*, 75 HARV. BUS. REV. 84, 86 (1997) (“Modularity is a strategy for organizing complex products and processes efficiently.”).

<sup>236</sup> Langlois, *supra* note 234, at 19 (“Modularity is a very general set of principles for managing complexity. By breaking up a complex system into discrete pieces—which can then communicate with one another only through standardized interfaces within a standardized architecture—one can eliminate what would otherwise be an unmanageable spaghetti tangle of systemic interconnections.”).

<sup>237</sup> Baldwin & Clark, *supra* note 235, at 86 (“The visible design rules (also called *visible information*) are decisions that affect subsequent design decisions. Ideally, the visible design rules are established early in a design process and communicated broadly to those involved.”) (original italics).

<sup>238</sup> *Id.*

<sup>239</sup> *Id.*

sets forth how those sub-systems fit together in concert.<sup>240</sup> As Henry Smith notes, modularity provides two important benefits:

Modularity is beneficial in that it makes complexity manageable. It also allows multiple people to work on a larger problem, often in very specialized ways, without incurring the costs of intense communication. Finally, modularity allows a system to manage uncertainty; because each module can function and develop in relative isolation, these processes can occur without the need to resolve uncertainty elsewhere in the system. In this sense modularity is said to create options. Without modularity, keeping the options for certain decisions open would be prohibitively costly.<sup>241</sup>

Another important benefit to modularity in the context of collaborations is that developments in one contract's module can be exported to other contracts within the network. For instance, if teams from Party A and Party B operating within a module of a manufacturing contract hit upon, say, a new process for packaging and transporting assemblies between A and B, that process can be readily adopted in A and B's other collaborations.<sup>242</sup>

The Boeing-Spirit GTA and SBP, when read in conjunction with Boeing's supplier website,<sup>243</sup> provide an example of what the idea of pragmatic governance as a modular system really means. The GTA and SBP provide the initial architecture for the learning process between Boeing and Spirit: the contracts coordinate how co-development is to proceed through the various modules of the pragmatic governance process. For example, the contracts not only establish error detection/correction procedures that make up part of the pragmatic governance system but also create mechanisms (e.g. reporting regimens and co-location rules) that translate the results of those procedures into changes throughout the entire system. An additional layer of complexity is found, however, when one reads the GTA and SBP in conjunction with Boeing's supplier website. The website is designed to be an interface where suppliers can find the most up-to-date versions of the clauses in their contracts with Boeing. For example, the website contains, among many other things, a database of the constituent clauses that comprise Boeing's Quality Management System (BQMS),<sup>244</sup> which, as we saw in the case study above, is a key component to the error detection/correction regimen that Boeing uses in its collaborations. Noting that "these clauses are living documents," the website provides the latest version of particular modules of the BQMS, the date of the

---

<sup>240</sup> For a similar conception of contractual modularity applied in the context of boilerplate terms, see Henry Smith, *Modularity in Contracts: Boilerplate and Information Flow*, 104 MICH. L. REV. 1175 (2006).

<sup>241</sup> *Id.* at 1177.

<sup>242</sup> Subject to intellectual property limitations, of course.

<sup>243</sup> <http://www.boeing.com/companyoffices/doingbiz/>

<sup>244</sup> <http://www.boeing.com/companyoffices/doingbiz/clauses/clauses.html#common>. Note that these quality clauses apply only to Boeing's Integrated Defense System projects at one particular plant—when multiple types of projects are considered at various fabrication locations, the complexity and variety of Boeing's contracting becomes dizzying. The reader is encouraged to explore the Supplier Website to gain a sense of the breadth and depth of Boeing's efforts to coordinate its collaborations.

latest revision being given beside each contract clause.<sup>245</sup> Suppliers are encouraged to reference the database to keep track of the latest developments and their corresponding commitments.<sup>246</sup> This arrangement allows the clauses to be adjusted individually in real-time as necessities arise. In other words, one can think of the BQMS as a complex machine: when parts of the machine malfunction, the operators are able to replace the dysfunctional sub-system with an improved version. The “living” contract is the structure that provides both the architecture within which such change takes place and the interface through which the various modules communicate. Of course, it is important not to overstate the argument here: complete modularization is impossible, especially in a system that is built to react to emerging problems.<sup>247</sup> I.e. there will still be customization of contract clauses between Boeing and each supplier—this is why the website refers to these as “common quality clauses.”<sup>248</sup> These common modules, however, provide a baseline—or a “platform,” to borrow another term from the software industry—from which customization can proceed.<sup>249</sup>

Experimental economists’ recent work on the effect of learning processes in coordination games<sup>250</sup> suggests a number of reasons why such an architecture is not just convenient but necessary. First, where complex environments result in “enormous strategy spaces” (i.e. a large number of potentially fruitful strategies), discovering which strategy is best cannot be achieved through a simple set of learning procedures.<sup>251</sup> In other words, it is difficult to determine *ex ante* *how* to learn. This is problematic for coordination because parties may eventually settle on an inefficient joint strategy that is easier to locate in the near-term than one that is more efficient over time but harder to identify.<sup>252</sup> Pragmatic governance mechanisms can be understood as a response to such difficulty: they structure a common learning process that requires the parties to constantly

---

<sup>245</sup> *Id.* Note that suppliers were notified of clause changes through the purchase order mechanism. *Id.* (“For clauses incorporated by a purchase contract change, use the clause in effect as of the purchase contract change date, unless specified otherwise.”).

<sup>246</sup> *Id.* Note also that clause changes are also reflected in new purchase orders to the suppliers.

<sup>247</sup> See Sabel & Zeitlin, *supra* note 120, at 389.

<sup>248</sup> *Id.*

<sup>249</sup> Thanks to Josh Whitford for sharing with me this point about the limits and uses of modularity.

<sup>250</sup> Coordination games are typically seen to be uninteresting in contracting contexts because a coordination game assumes that parties’ interests are not conflicting and, thus, already aligned. See ABRAM CHAYES & ANTONIA CHAYES, *THE NEW SOVEREIGNTY: COMPLYING WITH INTERNATIONAL REGULATORY AGREEMENTS* 136 (1995) (citing John Ruggie, *Multilateralism: The Anatomy of an Institution*, 46 INT’L ORG. 582 (1992)). Therefore, one of this article’s theoretical implications is that this area of game theory has more application to contract theory than what first meets the eye. For a formal attempt to model “cooperative investments” (i.e. those not defined solely by conflicting “selfish” motivations) see Yeon-Koo Che & Donald Hausch, *Cooperative Investments and the Value of Contracting*, 89 AM. ECON. REV. 125 (1999).

<sup>251</sup> Ido Erev & Alvin Roth, *Predicting How People Play Games: Reinforcement Learning in Experimental Games with Unique, Mixed Strategy Equilibria*, 88 AM. ECON. REV. 848, 874 (“if the game has enormous strategy spaces (as close modeling of complex environments would be likely to yield) then it will not in general be practical either to solve for equilibrium or to simulate learning”).

<sup>252</sup> Vincent Crawford & Hans Haller, *Learning How to Cooperate: Optimal Play in Repeated Coordination Games*, 58 ECONOMETRICA 571, 584 (1990) (“it is sometimes optimal to forsake an efficient strategy forever in favor of an inefficient one that is less costly to locate”).

attempt to find a better joint strategy.<sup>253</sup> Second, because actors typically come to the situation with different learning propensities, their responses to a similar situation of endogenous uncertainty might diverge.<sup>254</sup> Or, even if learning propensities are identical, minor historical accidents that occur differently between the two parties (e.g. a researcher leaves one of the firms, a firm adopts a particular software upgrade that the other does not use, etc.) have been found to result in divergent outcomes in multiple equilibria coordination games.<sup>255</sup> In either case, having the parties follow the same pragmatic governance process keeps the parties moving in the same direction—not because it dictates that direction, but because it allows for concerted adjustment. Third, experimental research has shown that, in games with strategic uncertainty (where, in an economy with multiple equilibria, an actor has difficulty selecting an efficient strategy because she does not know what equilibrium strategy other actors are selecting),<sup>256</sup> players are prone to select “secure” yet inefficient outcomes because they consider optimistic views of other actors’ strategies as too “risky.”<sup>257</sup> This creates a downward spiral: in Van Huyck et al.’s experiment, only 10% of the players were able to predict the others’ first-round actions accurately;<sup>258</sup> with a majority of first-round choices inefficient, the players then converged on even more inefficient but secure outcomes in later game iterations.<sup>259</sup> Therefore, by providing a stable environment where the collaborators can discover the optimal outcome to their “game,” pragmatic governance mechanisms prevent such pathologies from developing. In short, the role of pragmatic governance mechanisms in facilitating and ordering joint understanding is similar to that of a language: these contracts can be considered *generative*—for, like a generative grammar, they provide the constituent parts from which an infinite set of possibilities can be constructed.<sup>260</sup>

From this perspective, the puzzling contract terms mentioned above can be properly understood. Error detection/correction is both unilateral because it must be so in order to allow for experimentation and required in order that each party provides the collaboration with lessons learned. Co-location is a method of making the learning process real-time, thus increasing innovation’s speed and richness. Expository error

---

<sup>253</sup> This claim is corroborated through Crawford and Haller’s discussion of how experimentation with a suboptimal strategy can be a process for learning about more optimal strategies. *Id.* (“it is sometimes optimal to use one coordination problem as a ‘trial run’ for another whose solution has a higher payoff but is more costly to locate”).

<sup>254</sup> See *id.* at 859 (“Because different subjects may behave differently (especially when they are inexperienced) an important part of the environment may therefore be stochastic.”).

<sup>255</sup> John Van Huyck, John Cook & Raymond Battalio, *Adaptive Behavior and Coordination Failure*, 32 J. OF ECON. BEHAVIOR AND ORG. 483, 483-4 (1997). Note: a multiple equilibria game is one where there is more than one way to optimize the players’ interests.

<sup>256</sup> Note that strategic uncertainty is similar to neither Prisoners’ Dilemma, which is a problem of conflicting objectives, nor moral hazard, which is a problem of information asymmetries. John Van Huyck, Raymond Battalio & Richard O. Beil, *Tacit Coordination Games, Strategic Uncertainty, and Coordination Failure*, 80 AM. ECON. REV. 234, 247 (1990).

<sup>257</sup> *Id.*

<sup>258</sup> *Id.* at 239.

<sup>259</sup> *Id.* at 241 (“But rather than converging to the payoff dominant equilibrium or the initial outcome of the treatment, the most inefficient outcome obtains in all seven experiments.”).

<sup>260</sup> See generally NOAM CHOMSKY, TOPICS IN THE THEORY OF GENERATIVE GRAMMAR (1966).

reporting also furthers learning by teaching the parties why something went wrong, thus allowing them to make appropriate adjustments elsewhere in the design. Benchmarking processes are used not only at the beginning of the collaboration but throughout the duration of the project in order to constantly reinvigorate discovery. Explicit, intricate change processes are necessary in order to keep the joint learning process moving on track—failure to accurately indicate a change not only means subsequent compatibility problems in the product itself but also introduces the possibility that joint discoveries will not be realized because of disconnects in the iterated design process. This, of course, also explains the coordinating functions that are required of committees and project managers. Thus, such terms systematize joint learning.

#### b. Generative Contracting and Interest Alignment

Invoking coordination games, which assume that the parties' interests are already aligned, calls into question the core assumption that contracts are tools for aligning parties' divergent interests through the bargained-for allocation of risk. While I am comfortable with understanding contracts as something other than mere risk allocation devices, I think there is a possibility that generative contracting plays a role in interest alignment. This possibility comes into view when one considers the complex theoretical question that these contracts raise: what exactly are the parties learning? Are they simply learning new strategies for realizing their already-known self interests? Or do the rigors of pragmatic governance suggest parties are exploring something more fundamental: the very self interests we usually presume to be fixed? I will briefly discuss these two possibilities, deferring a more detailed discussion.<sup>261</sup>

The argument that pragmatic governance allows parties to discover new strategies for realizing their already-known self interests—what we might consider the standard line from microeconomics—is straightforward and primarily methodological. Thinking of generative contracts as strategy-discovery tools allows the analyst to retain the assumption of a priori fixed preferences that underlies microeconomic theory. Under this interpretation, generative contracts do not have a direct role to play in interest alignment: interests are presumed to be aligned already. While my theory of endogenous uncertainty grates against this conception of actor rationality, I recognize that, where one is trying to build a generalized and efficient theory of how these contracts are designed, the traditional approach's simplified conception may be appropriate.

It is important to note, however, that thinking of generative contracts as strategy-discovery tools glosses over some important issues. First, if interests are already aligned, then why insert this learning process into a contract capable of court enforcement? Of course, some sort of institutionalization would be necessary in order for learning not to lead to entropy. But why would the parties employ lawyers to make sure that this institutionalization would be *enforceable*? The concern for enforceability suggests that the parties are concerned about interest alignment and see pragmatic governance as a means for (continually) aligning those interests. Secondly, there is the question of whether "interest" and "strategy" as traditionally conceived are meaningful in situations

---

<sup>261</sup> See Jennejohn, *supra* note 19.

of collaborative innovation, where the parties consistently question their own activities. To constantly change, if not abandon, one's earlier strategy is to render the word "strategy" meaningless, unless one thinks having a strategy-to-change-one's-strategy makes any sense. The elusiveness of the concept of strategy belies difficulty in pinning down fixed interests: standard microeconomic theory assumes that a priori-determined preferences allow actors to locate and rank potential strategies along a single metric.<sup>262</sup> To constantly reorganize those strategies on that metric (if such a metric in fact exists) is to suggest either that self interest changes (i.e. it is not fixed) or that self interest is constant but only in a vague, almost vacuous, sense (e.g. collaborators do have a steady interest in something basic such as "making a profit"). In either interpretation, predetermined self interest is not a reliable foundation for erecting a theory of contract design because that self interest is dynamic. Helper et al. make the same argument I am giving here in slightly different terms:

[P]ragmatic problem-solving deliberation loosens the hold of interest by fitfully darting, as it were, beyond its reach. Solutions are uncovered bit by bit as the inadequacies of customary answers are traced back to their source and unfamiliar territory is steadily charted. *But self-interest depends as much in its calculations of advantage on settled expectations as bounded rationality depends upon routines in its searches. It can no more evaluate the surprising outcomes of pragmatic searches than bounded rationality can anticipate them.*<sup>263</sup>

In other words, if we take innovation seriously, we recognize that rigorous pragmatic collaboration, by constantly recasting future expectations, consistently unsettles clearly-defined self interests.<sup>264</sup> It is important not to take this argument too far: I am not saying that self interest is nonexistent or is entirely constructed circumstantially. I am simply arguing that, in these collaborations, self interest is as much a dependent variable as an independent.

Furthermore, this alternative conception of "interest" and "strategy" can still account for the alignment of collaborators' interests, albeit in a different sense than the traditional account. The argument is simply that when learning is coordinated effectively, parties' interests align as they jointly discover a common equilibrium. Effective learning facilitates "information exchanges [that] lead the actors to convergent

---

<sup>262</sup> Nussbaum, *supra* note 221, at 1197-8 ("Law and Economics has been built on a particular set of conceptual foundations. These involve at least the following ideas: that rational agents are self-interested maximizers of utility; that utility can best be understood... as a single item varying only in quantity; that utility is best analyzed in terms of the satisfaction of preferences; that preferences are exogenous, i.e., not significantly shaped by laws and institutions; and that the ends adopted by an agent cannot themselves be the subject of rational deliberation, although agents may deliberate about instrumental means to ends.").

<sup>263</sup> Helper et al., *Pragmatic Collaborations* at 473 (emphasis added).

<sup>264</sup> Here, my point about endogenous uncertainty is crucial. Of course, the economic literature has long recognized that one's future expectations can change frequently over the duration of a commercial relationship. The key difference here is that the parties' purposeful activity causes the alteration in future expectations, not the changing of the external "state of the world." This is why it is meaningful to talk about *self-interest* being unfixed: parties question, explore, and reform their own self-interests *on purpose*.

understandings of the world they are exploring.”<sup>265</sup> This convergent understanding, as it results in the realization of innovative results, aligns parties’ interests through a virtuous cycle: “once the cooperative exploration of ambiguity begins, the returns to the partners from further joint discoveries are so great that it pays to keep cooperating.”<sup>266</sup> With self interest dis-entrenched, pragmatic collaboration can align interests because it allows the (ever temporary) redefinition of those interests to coalesce around a commonly-held outcome, this outcome being commonly-held because cooperative activity is required to discover what that outcome is. Thus, joint learning does not harness the hold-up problem so much as *short-circuit* it.

In summary, while I accept that the simplified view of fixed ends might reveal interesting insights into how generative contracts are designed efficiently, I also believe that an alternative theory of interest alignment has both the tools to produce equally useful insights and the added advantage of accommodating the complex reality we observe.

### c. Contract as Constitution?

This alternative conception of contract’s role in interest alignment complicates the flexibility/planning dichotomy that has long been considered to be the heart of executory contracts. The idea behind flexibility/planning was that, although parties wanted planned certainty and were thus inclined to draft rigid contracts, they would leave some elements of the contract incomplete in order to allow for flexibility in the face of an uncertain future.<sup>267</sup> This conception of contract assumes that the parties know what they want *ex ante* and have a “pure” strategy in mind of how to realize what they want if future states of the world were certain. When endogenous uncertainty is endemic, however, just the opposite is true: parties do not clearly know what they want *ex ante* and, thus, have no dominant strategy in mind as they proceed. In this case, contract flexibility is not a means for adjusting the original plan but is, rather, the means for creating that plan in the first place. Thus, flexible provisions in the contract—namely, pragmatic governance mechanisms—foster the plan’s coalescence. This might lead one to think of these contracts as constitutions—they determine how to get to a location rather than where to go.<sup>268</sup> They are processual rather than substantive. While this is true to some extent (especially where a governance committee is established), thinking of generative contracts simply as constitutions renders one-dimensional a multi-faceted form of economic organization.<sup>269</sup> Generative contracts do more than establish decision rules for the parties to follow or rights upon which either party may rely. They are not simply bylaws. Rather, they establish a practice that directs, though does not determine, the parties’ relationship towards a common (if emergent) goal. They are purposive. Thus,

---

<sup>265</sup> Helper et al., *Pragmatic Collaborations* at 466.

<sup>266</sup> *Id.* at 445.

<sup>267</sup> Macneil [1978], *supra* note 43, at 854 (discussing “the constant clash in modern economic structures between the need for stability and the need to respond to change.”); *Id.* at 889-890.

<sup>268</sup> See Klein, *Why Hold-ups Occur* at 453-4 (“The contract terms that define the self-enforcing range can be thought of as a “contractual constitution” that is not anticipated to be frequently amended.”).

<sup>269</sup> Macneil cautioned against classifying contracts as constitutions also, though for different reasons. Macneil [1978] *supra* note 43, at 894.

these contracts have more purpose than a political constitution or a corporate charter even though they retain aspects of both institutions' indeterminacy. In short, these contracts are new, hybrid creatures.



Part IV has covered a wide expanse of economic theory with brevity that might strike some as breathtaking. My hope is that the reader will forgive me for glossing over many important and interesting considerations in favor of addressing a few basic, core issues. The primary question of this part was how the outstanding theories of contract design might be amended to account for the new type of contract mechanisms observed in the evidence presented. Turning to Frank Knight's seminal work on uncertainty for foundation, I sketched the outline of a learning theory of contract design. This theory can be summarized as follows: pragmatic governance mechanisms are responses to the collaborators' need to learn about what it is they are actually doing. This is not simply a problem of information asymmetry. Rather, the ignorance involved here arises from innovation itself: as the collaborators jointly abandon convention and move into a novel production environment, both parties have equal trouble interpreting how new developments impact their respective self-interests. I.e. collaborators experience uncertainty—which has been created by their own purposeful actions and not by events external to the relationship—that is endogenous to the relationship. In such a situation, the imperative is not to prevent defection (the parties will have trouble determining when it is in their self-interest to defect) but to promote joint learning. Pragmatic governance mechanisms are, thus, institutions that systematize this learning process. This systematization not only promotes learning but also aligns the parties' interests: as the collaborators' learn together about what possible outcomes can result from their joint efforts, their self-interests converge accordingly. Because it challenges some of economic theory's core assumptions, I understand this article to present a re-conception of the theory of contract design.

## 5. Conclusion

This final section summarizes my argument and, then, examines the article's ramifications for debates ranging from how courts should enforce contracts to how we theorize the boundaries of the firm to how we fashion policies to promote economic development.

### 5.1 Summary in Perspective

This article began with the observation that recent developments have rendered problematic our standard answers to the question of how capitalism is governed. With the rise of the network as a form of economic organization,<sup>270</sup> the major theories of contract design have struggled to explain how contract, presumed to be susceptible to

---

<sup>270</sup> Powell, *supra* note 5.

hold-up problems, can govern the collaboration that constitutes networked production.<sup>271</sup> In the spirit of amending the standard approaches, I have argued that the design of these contracts—which I have termed “generative” in order to capture their role in governing innovation—can only be understood if a learning theory is included in our repertoire. Such a theory also explains how both the uncertainty and potential opportunism inherent in collaborative innovation can be harnessed.

While much of this article is dedicated to showing the limits of current theories of contract design, I am sincere in my claim that this exercise is one of amendment and not demolition. This is because my theory of contract design would be incomplete if taken alone. These contracts are hybrids: they contain pragmatic governance mechanisms which imbue them with their generative character; however, they also contain “traditional” risk-allocation terms, such as limitations on liability, indemnifications, force majeure clauses, etc. Thus, the remaining puzzle, for which there is insufficient space to discuss here, is how terms directed at exogenous uncertainty and those focused on endogenous uncertainty interact. The trick is theorizing a situation where parties play a cooperation game and a coordination game in tandem—their moves in one game affect simultaneously their moves in the other.<sup>272</sup>

## 5.2 Ramifications of the article

### 5.2.1 Contract enforcement

A question that has perhaps been at the back of the legal reader’s mind throughout this paper: how should the courts enforce these contracts? In reply, I will briefly outline the argument of this article’s sister paper,<sup>273</sup> which is that typical court adjudication in the United States, which follows contextualist doctrines of contract interpretation, is inappropriate for innovative collaboration. Contextualism’s reliance on generalized legal rules contradicts the innovative practices pursued in these relationships. Because contextualism misconceives innovation’s convention-abandoning nature, it becomes a hindrance to collaborative activity. This argument, however, does not lead to a wholesale embrace of formalist contract enforcement. The most convincing arguments for formalist contract enforcement point out that court intervention in contract disputes might actively harm the relationship-preserving social norms that typically govern contractual relationships.<sup>274</sup> However, as we discussed above, the disciplines of continuous innovation established in generative contracts compromise social norms’ ability to govern collaborative innovation. Thus, it is difficult to argue that courts should use formalist as

<sup>271</sup> Holmström & Roberts, *supra* note 12.

<sup>272</sup> There is a loose analogy here to Robert Putnam’s idea of “two-level games.” Robert Putnam, *Diplomacy and Domestic Politics: The Logic of Two-Level Games*, 42 INT’L ORGANIZATION 427 (1988). The difference here though is that, unlike in Putnam’s theory, the two games are being played between the same two parties—Putnam’s idea was to link moves in a game between Party A and Party B with a game between Party A and Party C.

<sup>273</sup> Jennejohn, *supra* note 19.

<sup>274</sup> Robert Scott, *A Theory of Self-Enforcing Indefinite Agreements*, 103 COLUM. L. REV. 1641, 1645 (2003) (arguing that formalist interpretation protects reciprocity norms because “legal liability can increase moral hazard and it may also ‘crowd out’ the parties’ self-enforcing mechanisms”).

opposed to contextualist enforcement in order to preserve reciprocity norms when those norms simply do not hold sway in these relationships. One is left then to argue that formalist enforcement should be used in order to encourage private ordering as a good in itself. However, because it is so inappropriate for enforcing generative contracts, contextualism already creates an incentive for parties to privately enforce. Indeed, as this article's sister paper fully explores, collaborators fashion dispute resolution mechanisms that allow for contract enforcement on non-contextualist lines. Most importantly, however, this private ordering mirrors the problem-solving logic of pragmatic governance: parties use internal escalation procedures and external alternative dispute resolution in a way that benchmarks, error detects/corrects, and simultaneously engineers solutions to collaborators' problems.<sup>275</sup> Thus, the learning theory of contract outlined in this paper is a descriptive theory of not only contract design but also contract enforcement. In other words, a third way of contract enforcement, transcending the contextualism v. formalism debate, is available.

### 5.2.2 The Theory of the Firm

The micro-level theory presented here provides insight into alternative macro-level theories of the firm. For example, my learning theory of contract design complements the knowledge-based theory of the firm of Stefano Brusoni and colleagues. Based on an analysis of the aerospace engine control systems industry, Brusoni et al. argue that the decision to vertically integrate or de-integrate is actually two choices: first, whether or not the firm should outsource *production*; second, whether or not the firm should outsource *technological knowledge*.<sup>276</sup> They find that there is a middle-ground between the vertically-integrated and the deverticalized firm: the "loosely coupled" organization which has outsourced production but has kept considerable portions of technological knowledge in-house—i.e. "lean" companies... maintain wide (and widening) knowledge bases."<sup>277</sup> Keeping a significant amount of knowledge in-house is necessary when a firm has to coordinate the production of a multitechnology product among a host of suppliers: the fact that the product integrates a number of technologies means that those technologies' respective rates of innovation will almost assuredly vary, requiring the core firm to have a reserve of knowledge sufficient to allow it to redirect related projects when any given technology changes.<sup>278</sup> Interestingly for the purposes of this article, Brusoni et al. identify collaboration agreements with suppliers and universities as the source for developing this in-house technological knowledge.<sup>279</sup> This article then opens a new perspective on the theory of the firm presented by Brusoni et al.: namely, the question of how the design of the pragmatic governance mechanisms found in a generative contract impact the organization of a loosely-coupled network. It is tempting to think of this question in the age-old terms of reliability: i.e. how can pragmatic governance mechanisms be designed in order to make such a network stable

<sup>275</sup> See Jennejohn, *supra* note 19.

<sup>276</sup> Stefano Brusoni, Andrea Principe, and Keith Pavitt, *Knowledge Specialization, Organizational Coupling, and the Boundaries of the Firm: Why Do Firms Know More than They Make?*, 46 ADMIN. SCIENCE QUARTERLY 597, 597 (2001).

<sup>277</sup> *Id.* at 598-9, 610.

<sup>278</sup> *Id.* at 608.

<sup>279</sup> *Id.* at 614.

and, perhaps even, certain. While there is certainly an important place for such considerations, overemphasis on legal certainty grates against this article's entire point that generative contracts harness uncertainty by exploiting it through experimentation. They fight fire with fire. Thus, an equally interesting take on the connection between pragmatic governance mechanisms and networked innovation is how these contracts constrain, encourage, or funnel innovations between the parties immediate to an agreement and those throughout the wider network.<sup>280</sup>

### 5.2.3 Contract and Development

The literature on contract and economic development has focused heavily on the role of enforcement institutions in the development process.<sup>281</sup> While this focus is clearly important,<sup>282</sup> its limits have begun to emerge in recent years.<sup>283</sup> One of this article's implications, however, is that contract design provides an alternative research agenda for exploring law's impact on economic development.

Two particular ramifications are worth mentioning in the brief space afforded. First, understanding generative contracting is important for governments and organizations that are in the business of promoting development through market intervention. The reasons are simple: first, networked innovation obviously brings with it technological and informational externalities—thus, to promote the development of such networks a la standard industrial policy is to boost not only growth rates but also the knowledge base of the affected economy. Second, if one hopes to build the next Bangalore in one's underdeveloped country, it can only help to understand how the relationships that comprise a globally-integrated industrial cluster are governed. This article shows that one cannot assume that a contract's substance is development-neutral, that it simply reflects the idiosyncratic wishes of the contracting parties and that the only important thing is that someone, either the state or a private tribunal, enforces the performance of those wishes if a party breaches. Rather, because generative contracts underpin entire networks, their substance matters directly for those involved in the network. This is readily apparent when one remembers that these *contracts are organizations*,<sup>284</sup> not simply commitments to perform discrete items in the future—i.e. how these organizations are constructed matters to others in the network and, in turn, to those trying to foster the adaptation of such a network in a host economy.

<sup>280</sup> Here we begin to see the connections between contract design and debates in antitrust and intellectual property.

<sup>281</sup> This focus is exemplified in Douglass North's pioneering work in economic history. *See generally* DOUGLASS NORTH, INSTITUTIONS, INSTITUTIONAL CHANGE AND ECONOMIC PERFORMANCE (1990). Enforcement's role achieved particular notoriety through La Porta et al.'s comparative analysis of various legal traditions' property/contract laws and respective levels of enforcement "quality." Rafael La Porta, Florencio Lopez-de-Silanes, Andrei Schleifer & Robert Vishny, *Law and Finance*, 106 J. OF POLITICAL ECONOMY 1113 (1998).

<sup>282</sup> This article's sister paper addresses this topic in greater detail. *See* Jennejohn, *supra* note 19.

<sup>283</sup> The criticisms of the La Porta et al. work is illustrative. *See e.g.* Raghuram Rajan and Luigi Zingales, *The Great Reversals: The Politics of Financial Development in the Twentieth Century*, 69 J. OF FINANCIAL ECON. 5, 7 (2003) ("[I]n contrast to the findings of La Porta et al. for the 1990s, we find that countries with Common Law systems were not more financially developed in 1913.").

<sup>284</sup> *See* Smith & King, *supra* note 18.

Second, and more importantly, the creative logic of pragmatic governance mirrors what might be an emergent consensus of how to tackle underdevelopment. Recent work led by Dani Rodrik has argued that, because “there is no single mapping between the market and the set of non-market institutions required to sustain it,”<sup>285</sup> the key to development policy is not found in the Washington Consensus’ universality but in a particularized focus within an underdeveloped economy on “learning what one is good at producing.”<sup>286</sup> Learning is crucial because the simple transplantation of institutions or policies that “work” in one economy is, first, not guaranteed to “work” in the new context<sup>287</sup> and, second, is taken from a pool of institutional arrangements that “constitute a subset of the full range of potential institutional possibilities.”<sup>288</sup> Rodrik continues, “[t]here is no reason to suppose that modern societies have already managed to exhaust all the useful institutional variations that could underpin healthy and vibrant economies.”<sup>289</sup> In such an environment, learning what an economy is good at producing involves identifying “the binding constraints to growth,”<sup>290</sup> not in designing and implementing wholesale blueprints. Because “there is a large element of uncertainty at a disaggregated level as to what a country will be good at producing,”<sup>291</sup> learning is an entrepreneurial process of experimentation: “the right way of thinking of industrial policy is as a discovery process—one where firms and the government learn about underlying costs and opportunities and engage in strategic coordination.”<sup>292</sup> Strategic coordination—or collaboration—between the private and public sectors is necessary because both sectors have incomplete information: “[the government] can elicit useful information from the private sector only when it is engaged in an ongoing relationship with it.”<sup>293</sup> Thus, Rodrik’s industrial policy loosely reflects the logic driving the innovative collaborations examined in this article: the government and the private sector, uncertain about what constrains growth and where opportunities lie, jointly embark on a process of discovery, characterized by open information sharing and continual adjustment.<sup>294</sup> The tension within this new approach to industrial policy is that it must walk that very fine line between too much private-public partnering, which leads to agency capture, and too little collaboration, which leads to policymaking via bureaucratic

<sup>285</sup> Dani Rodrik, *Institutions for High-Quality Growth: What They are and How to Acquire Them*, paper presented at International Monetary Fund Conference on Second Generation Reforms 13 (Nov 8-9, 1999) also available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=215772](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=215772) (last visited 13 June 2007).

<sup>286</sup> Ricardo Hausmann and Dani Rodrik, *Economic Development as Self-Discovery*, CEPR Discussion Paper No. 3356 3-4 (2002).

<sup>287</sup> Daniel Berkowitz, Katharina Pistor & Jean-Francois Richard, *Economic Development, Legality, and the Transplant Effect*, 47 EUR. ECON. REV. 165, 165-6 (2003).

<sup>288</sup> Rodrik, *supra* note 285, at 14 (original emphasis); see generally ROBERTO UNGER, *DEMOCRACY REALIZED: THE PROGRESSIVE ALTERNATIVE* (1998).

<sup>289</sup> Rodrik, *supra* note 285, at 14.

<sup>290</sup> Hausmann & Rodrik, *supra* note 286, at 6.

<sup>291</sup> *Id.* at 8.

<sup>292</sup> Dani Rodrik, *Industrial Policy for the 21<sup>st</sup> Century*, working paper Kennedy School of Government, Harvard 3 (2004).

<sup>293</sup> *Id.* at 4.

<sup>294</sup> Indeed, Rodrik briefly discusses Sabel’s work on institutional innovation. *Id.* at 18-19. For a more thorough description of the similarities between inter-firm collaboration and new industrial policy see Charles Sabel, *Bootstrapping Development: Rethinking the Role of Public Intervention in Promoting Growth*, in *ON CAPITALISM*, 305 (Victor Nee & Richard Swedberg, eds. 2007).

*dictat*.<sup>295</sup> To achieve this balance, Rodrik recommends an alternative to the principal-agent model of how the government (the principal) interacts with the private sector (the agents): “[w]hat is needed instead [of principal-agent governance] is a more flexible form of strategic collaboration between public and private sectors, designed to elicit information about objectives, distribute responsibilities for solutions, and evaluate outcomes as they appear.”<sup>296</sup>

The generative contracts examined in this paper provide, foremost, concrete and detailed examples of how to implement the general prescriptions Rodrik provides.<sup>297</sup> For example, the private sector, as we have seen, addresses Rodrik’s valid concern about accountability and long-term progress<sup>298</sup> through the use of not only benchmarking (which Rodrik discusses) but also through continual improvement mechanisms such as quality ratchet or cost-reduction clauses. Thus, these contracts hold practical lessons for development policymakers.

However, there might also be a theoretical lesson here: while Rodrik mentions the necessity for competence in the government agencies participating in collaborative development policy,<sup>299</sup> equal attention must be given to the need for capable private sector participants. Collaborative innovation assumes that all parties to the collaboration are competent learners; however, it is not guaranteed, especially in a developing economy context, that private sector firms actually will be competent. Another way of putting this point: Rodrik focuses on the uncertainty of what goods the underdeveloped economy should focus on producing; there is another source of uncertainty, however: there is also uncertainty as to whom the government should choose as a private sector partner. This is important because (1) successful relationships produce successful products, not the other way around, in the new economy<sup>300</sup> and because (2) some firms—i.e. those that produce commoditized, not customized, products—do not participate in collaborations because they cannot or will not achieve the requisite level of learning ability. The difficult question then for Rodrik’s theory is how the development agency will be able to not only maintain local legitimacy when it turns incompetent domestic firms away but also screen for competence in the first place. It is noteworthy that the collaborators we have studied in this article have addressed this very hurdle by the generative contracting we have observed: when learning ability is at issue, they institutionalize learning through pragmatic governance mechanisms. Thus, the contracts observed here might be not only exemplary of Rodrik’s theory but also an elemental part of any full implementation of Rodrik’s system.

---

<sup>295</sup> Rodrik, *supra* note 292, at 17.

<sup>296</sup> *Id.* at 18.

<sup>297</sup> Rodrik gives three general elements of the optimal design of a successful industrial policy process: “political leadership at the top,” “coordination and deliberation councils,” and “mechanisms of transparency and accountability.” *Id.* at 19-21.

<sup>298</sup> *Id.* at 22, 25.

<sup>299</sup> *Id.* at 23.

<sup>300</sup> Whitford, *New Old Economy* at 52 (“[I]t is misleading to assume that the optimal relationship will always be dictated by the good to be traded; the characteristics of the good itself are in many cases a primary object of negotiation and definition and thus themselves in part constituted by the relationship.”)

These tentative thoughts aside, the bottom line is that the most important contribution generative contracting can make to development policy at this stage is to substantiate this new approach's logic. Both theories are as yet in their infancy. Much remains to be learned; but that, after all, is the entire point.