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On the Genesis of Interfirm Relational Contracts

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Abstract. In a wide range of circumstances, relational contracts can enable strategies that might not otherwise be possible. While most studies focus on the maintenance and performance of existing relational contracts, this paper explores the origins of interfirm relational contracts, focusing on how firms go from no contract to a relational contract. Relying on a microanalytic investigation of the birth of the desktop laser printer industry, we identify a combination of four emergent and deliberate steps that enhance the probability that a relational contract will arise: preexisting personal relationships, capability complementarity, cultural similarity, and pursuit of noncompeting but mutually reinforcing revenue models. We consider how each of these factors helps to undergird the parties' clarity and credibility to increase the probability of the genesis of a relational contract, which in turn enables collaborating firms to undertake successful, difficult-to-imitate strategies.

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Keywords: strategic alliances • relational contracting • organizational capabilities • strategy implementation • competitive advantage • Canon-HP alliance

1. Introduction and Literature

What is the genesis of great strategies? There is no magic formula. Many factors must come together for the emergence of a great strategy—one that succeeds in creating persistently high performance compared with seemingly similar rivals (Dosi and Nelson 2010, Syverson 2011). And when those factors do converge, there is no guarantee that a great strategy will emerge. Said differently, there is no sufficient condition for the origination of a great strategy. We do believe that there exist many actions leaders can employ that can enhance the probability of creating a great strategy. In this paper, we focus on one of these actions—the creation and maintenance of relational contracts.

Relational contracts are noncodified understandings that cannot be easily adjudicated by courts and that facilitate collaboration and repeated interaction between actors, either within or across firms.¹ Scholars across many disciplines have studied the role of relationships in contracting and have determined that under many circumstances, relational contracting can support outcomes that would otherwise not be possible (Macaulay 1963, Geertz 1978, Macneil 1978, Ostrom 1990, Dyer and Singh 1998, Bernstein 2016). Relational contracts can be useful across a vast range of economic and business activities when two or more parties must cooperate to achieve an outcome and when there is sufficient uncertainty in the environment that a contract will be incomplete because of the inability of parties to specify all potential contingencies.

Empirical studies have corroborated the role of relational contracts, both within and between firms, in enhancing long-run performance. Within firms, the bulk of attention has focused on the employment relationship (e.g., MacLeod and Malcomson 1988, Gartenberg et al. 2015). Brief case studies of Toyota, Lincoln Electric, and Credit Suisse suggest how these firms have engendered employee productivity and loyalty through relational contracts (Gibbons and Henderson 2013). Between firms, several empirical studies identify effective relational contracts that appear to enhance performance (see Gil and Zanarone 2017 for a survey). For example, Gil et al. (2017) show that relationships in the airline industry between trunk and regional carriers enhance the performance of both carriers, Gulati and Nickerson (2008) and Dyer (1997) find that interorganizational trust and relationships can affect both governance form and contract performance in the auto industry, and Uzzi (1996) demonstrates that relationships can under many conditions enhance firm performance in the garment industry.

If relational contracts can support superior rent-generating strategies, then what is the genesis of a relational contract? Although the bulk of research on relational contracting focuses on settings in which such contracts already exist (e.g., Dyer 1997, Helper and Henderson 2014, Macchiavello and Morjaria 2015), a handful of scholars have wrestled with the question of origins. One view is that relational contracting is largely

emergent: not entirely planned but arising through give-and-take, happenstance, personal relations, and luck (Barney 1986, Mintzberg et al. 1996, Schilke and Cook 2013). Indeed, canonical examples of emergent strategy—such as Honda's entry into the U.S. motorcycle market—demonstrate this, as a key facet of Honda's emergent approach entailed creating productive relationships with new types of retailers (Pascale 1984). Such emergence is often facilitated by trust, by a conducive organizational culture, or by similarity in cultures between organizations.

An alternative view emphasizes the deliberate construction of effective relationships, arguing that appropriate incentives can create relational contracts (Malcomson 2013). In its most stark form, reaching an incentive compatibility constraint is sufficient to ensure that a contract survives and hence becomes relational, with defection unlikely (Kreps 1990). Gibbons and Henderson (2012) propose a less extreme version, arguing that relational contracts are difficult to create as a result of the challenges of credibility (persuading others that one will keep one's promises) and clarity (defining the terms of the relational contract).² Nevertheless, this view remains optimistic about the feasibility of establishing relational contracts, primarily based on the construction of appropriate incentive and governance structures (e.g., Baker et al. 2002). The strategic alliance literature also emphasizes deliberate construction of relationships, adding emphasis on partner-specific trust (e.g., Barney and Hansen 1995, Gulati 1995, Doz 1996) and the presence of relational capability (e.g., Anand and Khanna 2000, Kale et al. 2000).

In this paper we examine the genesis of relational contracts as distinct from the maintenance of those contracts. We combine elements of the literatures on relational contracting, trust, and the relational view of the firm with an in-depth study of the emergence of the desktop laser printer industry to derive a set of both deliberate and emergent properties that increases the likelihood that a relational contract will be formed. Specifically, a confluence of personal relationships, cultural similarities, complementary capabilities, and noncompeting and mutually reinforcing revenue models can create conditions under which relational contracts will form. (All of these plus effective governance and appropriate discount rates can sustain the created relational contract). We map these criteria into Gibbons and Henderson's (2012) notions of clarity and credibility—factors that they argue facilitate the creation of relational contracts—and show how these practices serve to overcome the clarity and credibility barriers to initiating relational contracts. Our approach integrates emergent (and thus difficult to replicate) elements with the more visible deliberate actions to explain why such relational contracts cannot easily

be replicated by others. Finally, we bring to the forefront a more detailed description than has previously been offered of the oft-cited Hewlett-Packard–Canon alliance in the larger context of the emergence of the desktop laser printer industry.

To illustrate this framework, we examine the birth of the desktop laser printer industry. Canon and Ricoh both developed laser engines, a key component for the desktop laser printer, and Hewlett-Packard (HP) and Apple both developed printers. Applying the relational contract lens to the various interactions between these engine and printer firms, we explain why only HP and Canon developed a successful long-term collaboration. The two firms have teamed up to design and produce desktop laser printers since 1984 in one of the most successful business collaborations of the last half-century. By contrast, Apple failed to develop a comparable relationship with Canon, and Ricoh similarly failed to establish a strong relational contract with HP. We have conducted extensive interviews with the executives and managers of these companies to understand the genesis and evolution of realized and unrealized relationships over a 30-year period.

We are also able to identify two further aspects in the relational contract between HP and Canon that are rarely discussed in the literature. First, we identify how innovations evolve in the context of relational contracts. Second, we identify how a strong relational contract might actually facilitate experimentation by allowing modest forays of what could be perceived by a more suspicious partner as “defection.” In particular, the belief that a relationship is strong might incentivize one firm to “defect” from the other firm, albeit temporarily, to induce behavior by the second firm.

In the next section we describe the Canon–HP alliance and the emergence of the desktop laser printer industry. In Section 3 we describe the genesis and maintenance of relational contracts, with an assessment of the Canon–HP alliance through the lens of credibility and clarity of relational contracts. In Section 4 we discuss the failure of relational contracting in the Apple–Canon and Ricoh–HP contracts. Section 5 discusses why the creation and maintenance of relational contracts can result in great strategies. We conclude in Section 6.

2. The Canon–HP Alliance and Emergence of the Desktop Laser Printer Industry in Brief

We start with an overview of the Canon–HP relationship in laser printers. This is based on extensive archival research and over 20 interviews with current and former executives, managers, and engineers at Canon, HP, Ricoh, and Apple—individuals who had responsibility for print technology and its sourcing,

development, and commercialization in the 1980s and 1990s.

A laser printer is made, essentially, of three main components—laser engine, “formatter” or “controller” card (a printed circuit board with software programmed onto the chips), and exterior features that incorporate design elements such as the plastic outside box and sheet output mechanism.³ To create a printed page, the paper passes from the feeder tray to the laser engine, where the page is electrically charged. Fine-grained toner of the opposite charge is attracted to the paper, heated, and fused to the page by the fuser assembly of the laser engine. The paper is then ejected to the exterior paper tray. The controller card governs the process and provides the many features that a given laser printer offers. In the late 1970s, Ricoh and Canon were pursuing projects in copier technology that they anticipated would have applicability to a new technology known as laser printing.⁴ In particular, the drum, fuser, and toner technology seemed to be directly applicable to laser printers. Both Ricoh and Canon developed laser printer engines by the beginning of the 1980s. HP engaged both companies in sequential efforts to build a laser printer. The first series of laser printers were huge, free-standing floor printers capable of producing 50–100 pages per minute (ppm).⁵ However, the printers were extremely expensive (\$150,000), were quite unreliable, and used messy liquid toner.

By 1983, Canon had developed a technology, borrowed from its desktop copier division, to create a small, dry toner, desktop laser printer engine. Canon managers brought the technology to the United States for a “road show,” visiting top computer and printer manufacturers such as IBM, Apple, Compaq, DEC, and HP. HP and Apple expressed the most interest in the engine, and both firms agreed to develop and sell a laser printer based on the Canon engine.

The engineers and commercial managers saw no need for a contract between HP and Canon to pursue the desktop laser printer project. They had worked together before and had developed strong personal and working relationships, albeit on a commercially failed product. However, senior executives and legal departments in both firms insisted that a contract be written. As described by multiple interviewees, the contract resembled a master purchase agreement, which specified rights and time windows to make and cancel orders, quality assurance (warranties), intellectual property rules, and product shipping controls. The contract was silent about price, quantity, innovation, future products, or “rules of engagement.” All of these things would be handled on a case-by-case basis outside of the contract. This contract was 15–20 pages long, and we have been told that it remains the only written contract governing desktop laser printer development, manufacturing, and commercialization during

the entire 35-year relationship between Canon and HP, covering tens of millions of printers, tens of billions of dollars in revenue, and billions of dollars in profit.⁶ Indeed, analyst estimates indicate that for a number of years, over one-half of HP’s profit was attributable to its printer division. We understand that this contract is still in operation today.

In our interviews, managers stressed the informal nature of their interactions. Whenever HP or Canon needed anything, they were supposed to “just ask.” A second major characteristic of the interfirm relationship was the need to communicate information. Negotiations were usually based on extensive information interchange with a fact-based discussion in the search for the “true” or “most likely” state of affairs to drive the best decision.

3. Where Do Great Relational Contracts Come From?

How do two companies such as Canon and HP develop a 20-page contract governing tens of billions of dollars in sales over a span of nearly 35 years that does not specify price, quantity, product specifications, product evolution, or innovation? And what prevents other firms from doing the same? In this section, we draw from the literatures on relational contracting and the relational view, as well as additional insights from the desktop laser printer industry, to describe (a) the conditions in which interfirm relational contracts are beneficial, (b) factors that encourage the creation of relational contracts in these conditions, and (c) factors that support the continuation of such relational contracts. These conditions and factors increase the likelihood that relational contracts will be created, which in turn help to enable great strategies that would otherwise not be possible.

3.1. Background Condition: Sufficient Uncertainty That Noncodifiable Action Is Important

If one could write a fully contingent and enforceable contract, then one would have little use for a relational contract. Relational contracting becomes relevant when uncertainty is prevalent and incomplete contracts arise (e.g., Williamson 1985, 1991; Milgrom and Roberts 1992; Uzzi 1996). In these cases, the written contract serves as a framework for the relationship (Macneil 1978), but parties may wish to go above and beyond the letter of the contract as a result of expectations of continuing beneficial interactions. For example, research and development is a textbook case of an activity that can benefit from relational contracting (Milgrom and Roberts 1992, p. 131).

The early desktop laser printer industry was characterized by both technological uncertainty and market uncertainty. On the technical side, various managers and engineers among our interviewees noted

that there was significant technological risk regarding both product development and production processes, that there was uncertainty that the product would meet minimal functional needs, and that investment in this effort required a big “leap of faith.” On the commercial side, HP managers described substantial uncertainty whether the printer would sell, a near inability to forecast demand, and a decision-making process driven largely by concerns that IBM would enter first and preempt HP. It would have been difficult in this uncertain environment to write a fully contingent contract for the creation of the desktop laser printer.

3.2. Developing Relational Contracts: Going from Zero to Relationships

In those cases where relational contracts are beneficial for rent-generating strategy, how can firms go from “zero” to a relational contract? In recent work, Gibbons and Henderson (2012) provide a useful organizing framework for thinking about the requirements for building and sustaining relational contracts to yield enduring competitive advantage: notably, credibility and clarity. Credibility is defined as persuading others that one is likely to keep one’s promises. Clarity is defined as clearly communicating the terms of the relational contract. Although these authors apply this framework to explain the challenge of copying within-firm relational contracts, their approach is also applicable to understanding the inimitability of interfirm relational contracts. Indeed, the ideas discussed below can also be conceived as practices employed by companies to generate the clarity and credibility necessary to create a relational contract.

At the dawn of the laser printer industry, numerous laser printer firms and laser engine firms sought to engage in collaborative development and production of printers. These efforts largely failed, with the exception of Canon and HP. Why were Canon and HP able to establish a relationship where others failed? We focus on four characteristics—personal relationships, complementarity in capabilities, cultural similarity, and noncompeting and mutually reinforcing revenue models—and we connect these characteristics to their role in enhancing the credibility or clarity of relational contracts.⁷ We consider each in turn.

3.2.1. Personal Relationships. The first characteristic to increase the likelihood of forming a relational contract is a trusting personal relationship. The importance of personal relationships and endorsements to support exchange and create high performance is not a new concept (e.g., Macaulay 1963, Burt 1992, Stuart et al. 1999, Jap and Anderson 2003). In the relational contracting context, a personal connection can serve as the precursor to the credible creation of an interfirm relationship (Rosenkopf et al. 2001). Schilke and Cook (2013) recognize this in their process theory of trust,

where interpersonal interactions build trust and confidence in a personal relationship, which is then translated to other individuals and to the organizational level. Gulati and Nickerson (2008) show that interorganizational trust leads to higher performance in the auto industry, while Zaheer et al. (1998) show that interfirm trust yields higher performance in the electrical equipment manufacturing industry.

In sum, personal relationships serve to undergird noncodified understandings and allow relational contracts to emerge where otherwise they may not. Personal relationships and the attendant “trust” infuse a relational contract with credibility; personal assurances among known counterparts provide actors with confidence that promises will be honored and that the counterpart will exert effort achieve the goals of the project.

In the Canon and HP case, David Packard visited Japan in the 1960s when HP was seeking a joint venture partner to create a marketing and sales arm in the country. During this visit, Packard met Takeshi Mitarai, the head of Canon. Soon thereafter, Mitarai’s son, Hajime Mitarai, applied to Stanford for a Ph.D. in computer science. Although the exact circumstances of the application are unclear, Packard phoned the dean of the engineering school to inquire about the application. Soon thereafter, the younger Mitarai was accepted to Stanford. This was the start of a personal relationship between the CEOs of the two companies. When Canon began to develop laser engine technology, Mitarai told Packard that the two companies should consider working together on the venture. Packard passed this idea on to the HP Boise office, where printing technology was being developed. This led to the technically successful, albeit commercially unsuccessful, large-scale EPOC laser printer project.

Consequently, at the beginning of their desktop laser printer collaboration, several Canon and HP engineers had already developed personal ties. Jim Hall, the founding and head engineer on HP’s laser printer projects, developed personal relationships with many engineers on the Canon team during the EPOC project and maintained these after the project’s termination. Hajime Mitarai had become head of Canon Global Research Labs and worked closely with Doug Hammond, head of HP R&D for printing.

As the collaboration progressed, the managers at HP and Canon developed an intentional strategy and hierarchical structure to strengthen personal bonds. They held annual or semiannual CEO-CEO meetings, more frequent GM-GM meetings (Takashi Kitamura of Canon and Dick Hackborn of HP), and even more frequent director, head, and manager meetings. These were explicitly designed to build both working and personal relationships, often including family activities, visits to each others’ homes, joint recreational

activities (golf, skiing, rodeos, visits to hot springs), etc. This became an important mechanism for cementing personal relationships, with heavy involvement of spouses and families.

In addition, to further promote personal relationships, key personnel were only infrequently rotated. At Canon, individuals such as Kitamura, Junji Ichikawa, and HP Relationship Manager Artie Arishima stayed connected to the laser printer projects for nearly two decades. Likewise, personnel rotation at HP was somewhat sticky, especially at some crucial points in the relationship. Although HP managers rotated more frequently than Canon managers, key HP personnel including Jim Hall (chief engineer), George Taylor (Canon relationship manager), Von Hansen (R&D), and Dick Hackborn (general manager/vice president (VP)/executive VP) stayed in laser printer-related positions for decades.

Interviewees uniformly cited these relationships as crucial to both sides' willingness to share information, give the other the benefit of the doubt, and foster a climate of cooperation. Our interpretation is that these personal relations generated credibility for each party and hence provided crucial support for development of the relational contract between Canon and HP. To a substantial extent, these personal relationships were emergent components that are difficult to replicate or even plan.⁸

3.2.2. Capabilities Complementarity. A second feature that facilitates the creation of relational contracts is complementary capabilities. Most strategic alliances begin with a need to reach out to a partner that has technology, skills, or capabilities that complements the assets of the focal company (Brouthers et al. 1995, Dyer and Singh 1998). Indeed, the rationale for most alliances is predicated on obtaining some capability or resource that the potential partner possesses and the focal firm lacks (e.g., Nakamura et al. 1996). Such complementarity facilitates both clarity and credibility of a relational contract. Capabilities' complementarity allows each firm to clearly understand its role and its partner's role and to recognize where the role boundaries exist. Furthermore, such complementarity may make relational contracts more credible by improving the cost/benefit calculation for collaboration—if two firms have complementary rather than overlapping capabilities, then there are reduced risks of knowledge leakage and hence reduced risks of defection from the relational contract (Gulati et al. 1998, Oxley and Sampson 2004).

What did Canon and HP each bring to their partnership? Canon invented a cartridge-based, dry toner laser engine that could be efficiently mass-produced. This technology enjoyed patent protection, and Canon was far down the learning curve in this technological area because of its prowess in the desktop copier business.

Moreover, the manufacturing investment required to produce these engines was substantial. It would have been extremely difficult if not impossible for HP to match Canon in the development of laser engines. Conversely, HP possessed substantial knowledge in software development and formatter cards, which enabled HP to write software to control a laser engine. Of particular relevance, HP had invested substantial effort to develop a proprietary font set and printer control language called HP PCL (HP Printer Control Language). HP's software skill was difficult to replicate, as was the proprietary position of HP PCL. In addition, HP had strong downstream strengths including broad access to the distribution channels for computer equipment and accessories, a high-quality consumer brand, and expertise in U.S. advertising and marketing. Canon had minimal expertise in these areas in the United States and would be unlikely to be able to build these assets and capabilities in a timely manner. Our interpretation is that, with this division of expertise, it was generally clear which partner would be expected to deliver which subsets of the laser printer value chain, and the relative weakness of each firm in the other's area of strength offered confidence that the other firm could be trusted to work to keep the collaboration going.

3.2.3. Cultural Similarity. A third feature that facilitates the genesis of relational contracts is compatible organizational culture (Dyer et al. 2001, Kanter 2010). Dyer and Singh (1998) identify compatible cultures as a source of relational rents, Doz (1996) describes how organizational compatibility supports successful execution of alliances, and Kale et al. (2000) and Vlaar et al. (2006) discuss methods for surfacing potential sources of culture clash. Cultural similarity facilitates the clarity of a relational contract. In particular, cultural similarity allows firms to communicate to each other the terms of a relational contract in a way that each can easily understand. The presence of common values supports shared understandings that ensure clarity of communication and reduces the likelihood that ostensibly similar language will obscure substantive differences in expectation or interpretation. The codes, language, and processes are similar across organizations and can be better understood and internalized by each partner.

According to our interviewees, both HP and Canon saw themselves as engineering companies with a primary focus on technological expertise and quality. Interviewees from each firm talked of finding kindred spirits in the other firm, with engineers and managers engaged by similar topics and possessing deep mutual respect for each other's expertise. Our interpretation is that this compatible approach and perspective allowed the companies to pursue problems in a coordinated way, making communications and framing more efficient; problem solving more focused; and

common understandings about decision making, conceptual approaches, and relationships more likely.⁹

3.2.4. Noncompeting and Mutually Reinforcing Revenue Models. Fourth, a relational contract can be cultivated more easily when firms pursue noncompeting and mutually reinforcing revenue models, as this reduces tension in the initial contract bargaining. To give a somewhat formal example, imagine that two firms working together can jointly create value, v , and bargain over the split of this value, for example, by bargaining over a wholesale price, p . This bargaining reflects a zero-sum game in which the firms' revenue models are directly competing. If both firms are solely reliant on the revenue stream from v , then this bargaining will be particularly fierce and may yield little goodwill. However, if each firm can obtain an alternative revenue stream that is associated with v , but to which the other firm does not lay claim, then this can reduce the pressure of zero-sum bargaining over v . Put differently, the alternative revenue streams reduce the degree to which the firms have directly competing revenue models and hence increase willingness to engage in a long-term relationship. Even when revenue models are noncompeting, relational contracts are more likely to be created when these revenue models are mutually reinforcing than when they are inconsistent, as we will see in Section 4 with the Apple–Canon relationship.

According to our interviewees, while Canon and HP repeatedly engaged in bargaining over the wholesale price of the engine, the bargaining never reached the point of brinkmanship or ill-will. The firms obviously had opposing preferences for the wholesale prices of the laser engines, with Canon preferring higher prices and HP preferring lower prices. At the same time, each firm possessed an outside source of revenue to which the other did not lay claim. Canon developed the “all-in-one” toner cartridge. From the beginning, Canon had identified toner cartridge sales as a key component of its profit-maximizing revenue model. The firm understood deeply the “razor and razor blade model” from its earlier experience in the desktop copier business, where toner served as the razor blade. With this frame, Canon sought to maximize its sales of toner cartridges. Indeed, interviewees noted that while Canon was often ready to compromise on the wholesale price for engines in the face of unexpected exogenous shocks to the market, Canon was extremely reluctant to negotiate wholesale toner cartridge pricing. It was understood by both parties that this wholesale revenue stream belonged to Canon.¹⁰

In contrast, HP's revenue model emphasized the sale of hardware beyond laser printers, seeking to exploit complementarities among printers, computers, peripherals, and other accessories. HP thus focused on selling a high volume of printers and on encouraging sales of related HP equipment.¹¹ In sum, both companies had

two revenue streams: Canon from toner cartridges and engines and HP from computers/accessories and printers. Furthermore, both firms based their strategies on selling high volumes of engines. Our interpretation of the first point is that these multiple sources of revenue reduced the pressure to bargain fiercely over the wholesale price of laser engines more so than if the printer or engine were the only source of revenue for each company. The additional unique sources of revenue, and the relationship between the sales of the core product (printer/engine) and the complementary products (computers/toner cartridges), changed the incentives on price negotiations in a way that further supported the relational contract. Our interpretation of the second point is that Canon and HP had mutually reinforcing revenue models in that both firms were motivated to sell a substantial number of printers to either profit from the engines and toner cartridges (from Canon's perspective) or profit from more computers, printers, and complementary accessories (from HP's perspective). The presence of noncompeting and mutually reinforcing revenue models facilitated the creation of the Canon–HP relationship.

3.3. Maintaining the Relational Contract

Although our emphasis has been on the emergence of relational contracts, sustained maintenance of the relationship is crucial to long-term rent generation. The literature identifies two environmental characteristics that enhance the durability of relational contracts, although these are not usually considered strategic tools by the actors: low discount rates and relatively unattractive outside options (Gil and Zanarone 2017). The first of these ensures that an actor does not discount the benefits of continued interaction so greatly that it prefers to defect. The second implies that the relationship is sufficiently valuable such that a newly available outside option will not have enough long-term value to tempt an actor to exit the contract.

From a managerial perspective, though, there are strategic choices that can be made to assist in the maintenance of relational contracts. The same features that support the emergence of a relational contract tend to support its continuation. For example, cultural compatibility reduces the likelihood that a miscommunication between the parties will escalate to the point of threatening the relationship. Beyond these, the primary additional lever that actors can manipulate is aligned governance (Williamson 1985, Dyer and Singh 1998, Baker et al. 2002, Gil and Zanarone 2017). A vast literature finds that judicious allocation of asset ownership, decision-making rights, and property rights affect relational performance (e.g., Aghion and Tirole 1994, Mowery et al. 1996, Oxley and Wada 2009).

Although many assets in the Canon–HP relationship were necessarily governed by a particular party because of their relative capabilities (e.g., engine production by

Canon and printer distribution by HP), one interesting example of governance choice was related to the formatter (or print controller) boards. When the venture began, HP developed and owned HP PCL, but Canon designed and developed the formatter boards according to HP specifications. The formatter boards were then produced for the LaserJet and LaserJet II printers on assets owned by Canon in Japan. The rationale behind this decision was that formatter boards could be damaged if shipped from the United States to Japan for installation in the engines, so it was best to produce these components in the Canon factory. Alarms were sounded at HP, though, when Canon introduced its own LaserJet-equivalent printer into the U.S. market one year later. In negotiations preceding the LaserJet III introduction, HP successfully bargained to bring formatter board production back to the United States. HP established formatter board design, chip programming, and production facilities at its Boise site, shipping the boards to Canon in Japan for installation, despite the risk of damage en route. Our interpretation of this is that this shift in formatter board production provided a more balanced set of “bilateral hostages” (Williamson 1983) to support the continuation of this relationship.¹²

4. Apple and Ricoh’s Failure to Create Relational Contracts

The birth of the desktop laser printer industry was characterized by a number of contractual relationships between two laser engine producers and a handful of laser printer manufacturers. Although the previous section studied the Canon–HP story as the “winner” in the relational contracting competition, in this section we examine why Canon and Apple (printers) and Ricoh (engines) and HP failed to replicate the Canon–HP success, despite ostensibly similar partnerships.

Apple–Canon. By all accounts, Steve Jobs was excited about using the Canon laser engine to power Apple’s new LaserWriter laser printer. The LaserWriter, priced at \$7,000, was designed to print pictures the quality of the *Mona Lisa*. After two generations of product, Apple pulled the printer from the market. The Apple laser printer failed for many reasons. One was clearly commercial: the size of the market for a \$7,000 desktop printer, no matter how high the quality, was small. However, it is not the commercial failure of the Apple desktop LaserWriter that we focus on here; it is the relational contracting failure which we examine.

Apple and Canon began working together at the same time as HP and Canon. Similarly, this entailed initial involvement from the CEO and then sustained interaction among engineers and managers. Steve Jobs, not known for his charm, was not interested in a personal relationship with any of Canon’s managers or executives. Relatedly, although the managers and

engineers for the two companies interacted professionally, this interaction rarely extended into the personal realm. Our interviewees recounted that, when being entertained in Japan by Canon managers, Apple executives were known to say, “OK, I think we’re done with this social event; what is next?” They further indicated that Canon managers who had few close personal ties with their Apple counterparts had little motivation to exert effort or be responsive to requests made by Apple outside the contractual terms.

Moreover, although the Canon engine technology was complementary to the highly skilled software engineers that Apple employed, the cultures of the two companies were in conflict. Apple was characterized by informal, fast, and risk-taking decision making—not unlike a prototypical start-up and entrepreneurial firm. As a large, traditional Japanese company, Canon was organized along a strict hierarchy, with routinized, bureaucratic, and more risk-averse decision-making processes. Moreover, Apple never approached the Canon relationship as a partnership, primarily relying on arm’s-length communications of engine specifications rather than the joint development and problem solving that HP conducted with Canon. Finally, our interviews indicate that Apple’s emphasis on design rather than engineering, stemming from Jobs’s own strengths, led to a perceived undervaluing of Canon’s engineering skills within the relationship, further reinforcing Canon’s incentive to keep its effort in check.

Finally, although the revenue models for the two companies were noncompeting, they were not mutually reinforcing, making the relationship difficult to create and sustain on this dimension. As in the Canon–HP relationship, Canon sought to profit from engine sales and toner cartridges while Apple wanted to profit from sales of printers and companion Apple computers. However, Apple’s strategy was to reach the high-end but small niche of desktop printing. This small-volume strategy generated a high per-unit margin for Apple’s printers but was inconsistent with Canon’s revenue model of selling high volumes of toner cartridges.

HP–Ricoh. As a rival to Canon, Ricoh also produced laser engines. In the early 1980s, HP and Ricoh joined forces to deliver HP’s second laser printer and first desktop laser printer, the HP 2687A. It was slightly more successful commercially than the HP–Canon EPOC printer. Yet HP and Ricoh did not develop an enduring relationship. Why did Ricoh not displace Canon early on? It appears that the HP–Ricoh relationship was characterized by weaker levels on the criteria noted.

While Ricoh engineers did develop some personal relationships with engineers at HP, it was the middle- and lower-level employees who held these personal relationships. They did not extend to the executive level as they did between Canon and HP. Relatedly, although the firms’ technological capabilities were

complementary, the cultures of the organizations were different. Ricoh did not have the relentless focus on product innovation and product quality that Canon and HP possessed. Rather, former Ricoh managers involved in the project explained how Ricoh focused more heavily on process improvements to achieve low-cost provision of components and supplies, rather than on higher-cost improvements to perceived quality. In addition, Ricoh was not accustomed to meeting the tight deadlines with high quality and reliability standards that HP was accustomed to achieving.

Finally, the mutual reinforcement in the revenue models was problematic. Ricoh did employ dry toner in the 2687A printer, but it was a refillable container in the printer and not an easy-to-replace aftermarket cartridge. Standalone dry toner would easily become available from a number of vendors and would not have generated substantial profit for Ricoh. It was unclear how Ricoh's laser engine would be able to generate significant revenue without cutting into the profits generated by the printer itself.¹³

Together, the histories of Apple–Canon and HP–Rico highlight the fact that the presence or absence of the factors identified above have explanatory power in the creation and failure to create relational contracts in the desktop laser printer industry. More generally, why do some firms fail to develop effective relational contracts when conditions suggest that a relational contract will be the most effective form of transacting?

Frequently, firms begin the strategic partner search process with the question of capabilities' complementarity (Mowery et al. 1998). They must find a partner who can do what they cannot. They then screen the candidates based on their historical record, alliance history, financial performance, and record for reliability as a partner (Gulati 1995). More sophisticated companies

continue the examination with an eye toward cultural similarities between the focal firm and the potential partner (Doz and Hamel 1998, Dyer et al. 2001). This analysis will often fall short in the completion of an effective relational contract. First, firms fail to consider noncompeting and mutually reinforcing revenue models. With a focus on the product or service at hand, firms often do not consider how the partner will generate revenue that is correlated with the total value created in the main product but to which only they can lay claims. Second, and where many potentially great strategies fail, is in the failure to have and develop personal relationships. Personal relationships that are multilevel are usually built over time in earlier settings (Rosenkopf et al. 2001). And once these relationships are built, firms must work to maintain those relationships.

In Figure 1 we outline the above-discussed factors supporting the emergence of a relational contract, mapping them into the clarity and credibility criteria developed by Gibbons and Henderson (2012). In addition, we describe how actions in each of the transactions examined in this paper map to the characteristics to link managerial practices with theoretical underpinnings. Finally, we make an assessment, based on our interviews, as to how strong or weak these actions were in each of the four criteria. What emerges is that Canon and HP exhibited strength in all of these criteria, while Canon and Apple's relationship and Ricoh and HP's relationship lagged behind.

5. Why Do Relational Contracts Result in Great Strategies?

In circumstances where a relational contract is the appropriate form of governance, great strategies can

Figure 1. Summary of Relational Contracting Criteria as Applied to the Early Desktop Laser Printer Industry

Characteristic	Canon-HP	Canon-Apple	Ricoh-HP
Personal relationships (credibility)	STRONG CEO-CEO VP-VP Systems engineers-systems engineers R&D-R&D	WEAK Minimal	MODERATE Systems engineers-systems engineers
Complementary capabilities (clarity and credibility)	STRONG Canon: Engine/Cartridge HP: Software/Marketing/Distribution	MODERATE Canon: Engine/Cartridge Apple: Software/Marketing	MODERATE-STRONG Rico: Engine/Refillable toner HP: Software/Marketing/Distribution
Similar culture (clarity)	STRONG Canon: Leading engineering, mass production, hierarchical HP: Leading engineering, mass production, hierarchical	WEAK Canon: Leading engineering, mass production, hierarchical Apple: Entrepreneurial, niche differentiation, consumer focused	MODERATE Rico: Follower engineering, weakly mass production, hierarchical HP: Leading engineering, mass production, hierarchical
Noncompeting and mutually reinforcing revenue models (clarity and credibility)	STRONG Canon: Engines and toner cartridges (high volumes) HP: Printers and computers (high volumes)	MODERATE Canon: Engines and toner cartridges (high volumes) Apple: Printers and computers (low volumes, high-margins)	WEAK Rico: Engines (high volumes) HP: Printers and computers (high volumes)

emanate from these relational contracts for many reasons. Contracting governance efficiency (Williamson 1985), contractual longevity (Weber et al. 2011), and responsiveness to a changing environment (Gulati and Nickerson 2008) are just a few of the reasons that have been articulated in the literature. Indeed, as noted throughout the paper, a variety of authors have found evidence to support the link between relational contract stability and performance.

Here, we propose two additional features that relational contracts can provide to undergird great strategies. The first relates to incremental innovation. To the extent that a relational contract facilitates flexibility in coordinated adaptation, incremental innovations may occur faster and more frequently. In the laser printer industry, a far higher number of innovations were developed by Canon–HP than by Ricoh–HP or Apple–Canon (during equivalent time periods). These innovations included advances in the design, look, and feel of printers; formatter card integration; failure modes problem resolution; fonts, print control language, memory, and printer features; dual paper trays; resolution enhancement technologies (primarily from HP) that allow for higher resolution through software; and later the fast heated fuser (primarily Canon) that permitted the printer to warm up in two to three seconds, instead of a minute; and sheet feeding and duplexing. Our interpretation is that these innovations, among others, were enabled by the relational contract. The short contractual document between HP and Canon did not specify any road map for innovations, how improvements would be adopted, or how the research and development would be conducted. But in our interviews, managers from both sides were clear that these innovations were enabled through the relationships the engineers had in place that went beyond any contractual language that was specified.

A second and somewhat counterintuitive feature is that close relationships, if strong enough, might encourage one party to experiment with an outside party, knowing that the other party to the relationship will not necessarily perceive this as pure defection. An example of this occurred in the Canon–HP relationship with color printers. In 1995, HP, responding to projected evolution in customer demand, sought to develop a color laser printer. It made several requests to Canon to accelerate the development of a desktop color laser engine, but Canon demurred, apparently seeing no need for it. HP signed a contract with Konica, the then-leader in color engines, to provide the engine for its first generation color desktop laser printer. (HP's success subsequently demonstrated that a sizable color printer market did exist.) However, this unexpected move by HP led Canon to begin investing substantial resources to develop a high-quality color engine even before the size of the color laser printer

market had been fully demonstrated. After evaluating the new Canon engine, HP chose to return its second-generation (and beyond) color laser printer development back to Canon. In the estimation of the people we interviewed, this was one of the most difficult points in the Canon–HP relationship. It was also one of the most important. Our interpretation is that HP was willing to pursue the color printer experiment with Konica—which ultimately proved extremely profitable for both HP and Canon—in part because its managers believed that the Canon–HP relationship could withstand this strain.

6. Conclusion

Although there is no single formula for creating great strategies, there are conditions that can increase the likelihood that a strategy can become great. Relational contracts offer one avenue for long-term sustained superior performance. When contracts are incomplete and environments uncertain, creation and maintenance of relational contracts can permit firms to support strategies that would not be possible otherwise. To date, scholars have tended to focus on the maintenance and performance of relational contracts. Work on the origin of relational contracts is more sparse.

Drawing on the various literatures on trust, relationships, and relational contracting, and combining these literatures with a detailed study of the birth of the desktop laser printer industry, this paper identifies a number of antecedent emergent and deliberate steps that enhance the probability of creating a relational contract: personal relationships, capability complementarity, cultural similarity, and noncompeting but mutually reinforcing revenue models. These conditions encourage relational contracting, which will, in turn, assist in the development of great strategies. In conjunction with effective governance, these conditions further buttress the durability of relational contracts.

This paper illustrates that these characteristics made the entry into a relational contract easier for HP and Canon, and that the lack of these characteristics contributed substantially to the failure of the relationships between HP and Ricoh and between Apple and Canon. The relational contract between HP and Canon was sustained through a deepening of personal connections, reduction in incentives for defection, and aligning governance of the relationship so that bilateral dependence persisted. This, in turn, contributed to the credibility and clarity of the relational contract and led to sustained performance advantages for the participating firms.

We also identify the process of innovation that relational contracts enabled in the Canon–HP alliance. In particular, a series of incremental innovations were made possible through the relationship that would have been difficult to contract for in advance. This

close relationship also had a counterintuitive consequence: it made it easier for HP to experiment with another potential trading partner, knowing with some confidence that the strong relationship between HP and Canon would likely survive and spur Canon to develop color laser engines. Partners in weaker relationships might have viewed this behavior as abandonment of the partner and betrayal of the relational contract. Overall, the Canon–HP history serves to inform and enrich our understanding of how effective relational contracts arise and are nurtured.

To understand the genesis of relational contracts, one cannot rely simply on the emergent lens or the deliberate/strategic design lens. We argue that the genesis of relational contracts finds its foundations in both lenses at both the individual and corporate levels. Although we present only a deep description of the genesis of one industry and one relational contract that emanated from that industry's birth, we believe that future work could conduct large-scale statistical analysis and incorporate both the sociological and economic lenses to understand the genesis of relational contracts. Ultimately, we argue that the successful creation of relational contracts can support great strategies.

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Endnotes

¹ This definition of relational contracts attempts to summarize the various definitions in the literature. These include “collaboration sustained by the shadow of the future as opposed to formal contracts enforced by courts” (Gibbons and Henderson 2012, p. 1350); “understandings that the parties share about their roles in and rewards from cooperating together, but understandings so rooted in the details of the parties' relationship that they cannot be shared with a court” (Gibbons and Henderson 2013, p. 681); “[a contract that] does not attempt the impossible task of complete contracting but instead settles on an agreement that frames the relationship” (Milgrom and Roberts 1992, p. 131); “contracts that are enforced by parties through the threat of terminating trade, rather than by courts” (Gil and Zanarone 2017, p. 2); “informal agreements sustained by the value of future relationships” (Baker et al. 2002, p. 39); and “informal, self-enforced [open-ended] contracts [that complement court-enforced contracts]” (Halac 2012, p. 750).

² Barriers to copying relational contracts may also rest in the tacit knowledge required to create these contracts (Winter 2006).

³ This section draws heavily on de Figueiredo and Silverman (2012). For further discussion of the laser printer and laser engine industries, see de Figueiredo and Kyle (2006).

⁴ The first laser printer was developed at Xerox (Johnstone 1994).

⁵ One that is referred to later in this paper is the EPOC printer, which involved extensive joint research and development (R&D) between HP and Canon, with engineers from both companies working closely together.

⁶ We understand that the contract has been amended only a small number of times, all for relatively minor reasons. For example, at one point in the relationship, it was decided that HP should pay for the insurance to ship the printers from Japan to the United States because HP had access to much lower trans-Pacific shipping insurance rates.

⁷ Many authors have highlighted subsets of the elements presented here (e.g., Dyer and Singh 1998). In this paper we attempt to put these together in an organizing framework for identifying the conditions that facilitate the emergence of relational contracts.

⁸ It is intriguing that the close relationships among HP and Canon engineers were formed during a project that failed commercially. One implication is that, although personal relationships are largely emergent, a firm could deliberately seek to invest in such relationships without this investment being dependent on a commercially successful outcome. This is consistent with the observation of Rosenkopf et al. (2001) that firms can seek alliance partners by sending their personnel to sit on particular technical committees that are populated with personnel from those potential partners.

⁹ By contrast, the Apple–Canon interactions exhibited far less cultural similarity, as did HP–Ricoh interactions. We discuss these interactions in the next section.

¹⁰ Canon and HP were extremely careful to never discuss retail prices for printers.

¹¹ Although the firm prided itself on high-quality products, it appears to have priced competitively in order to generate large volumes of unit sales (de Figueiredo and Silverman 2007).

¹² Our interpretation is that Canon's entry into the U.S. market made HP more sensitive to the potential risks of defection in the relationship, which led HP to seek stronger ownership over the idiosyncratic formater assets (although interviewees did not use those exact words).

¹³ Ricoh did develop a dry toner cartridge laser engine soon thereafter.

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