# Organ Entrepreneurs

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The supply of human organs for transplantation might seem an unlikely place to begin thinking about entrepreneurship. After all, there is no production market for human organs. With the surprising exception of Iran, legal rules around the world make the sale of human organs for transplantation a criminal offense. Moreover, at first blush the social organization of the organ supply and the transplant system more generally seems quite far removed from the world of entrepreneurial innovation. In general, organ transplants are strongly regulated, allocation rules are governed mostly by medical criteria rather than supply and demand, and most people's conception of the system's organizing principle is based on an understanding of organ donation as a special, even sacred, sort of gift—the "gift of life." The market seems a long way off. While proposals for creating transplant markets have been made periodically since the 1980s, the casual observer could be forgiven for thinking that entrepreneurship was of little conceptual use in understanding the transplant field, and *vice versa*.

To the contrary, we argue, entrepreneurs have been very much present throughout the history of organ transplantation. This is partly due to the well-known failure of the supply of organs to meet demand for them, a circumstance that generally produces pressure for some sort of creative response. But our interest in the case goes beyond this. The history of innovation in organ transplantation is, of course, partly one of medical advances and technical developments that have made it possible—even routine—to safely remove a kidney from one person and put it in someone else. But it has also been a history of active exploration, innovation, and management of a potentially very controversial exchange at the seemingly clear boundaries that separate giving from selling, life from death, and right from wrong. Traffic across these boundaries, and experimentation with its form and scope, has been a feature of organ exchange since its earliest days. It has partly been a *cultural process*, with transplant innovators actively exploring what people will or will not tolerate when it comes to transferring goods or providing services under potentially controversial circumstances. It has partly been an *organizational problem*, as participants experimented with the logistical infrastructure necessary to accomplish the needed exchanges in some desired form. And it has also presented a *legal challenge*, as the entrepreneurs developing methods and rules of exchange have carried out their innovations in the shadow of the law. This has meant managing constraints or avoiding penalties imposed by legal requirements, and navigating legal obstacles that have sometimes proved to be real, and sometimes imagined.

Active experimentation with available forms of exchange, their institutionalization in organizational practices, and associated efforts to activate or avoid legal problems are common but underappreciated aspects of entrepreneurial activity. Innovation is often accompanied by an effort to make something new analogous to a more familiar transaction, or to present a potentially difficult exchange as satisfying not just an economic but also a morally valued end. Gift exchange and generalized reciprocity—whether considered as cultural forms, organizational techniques, or legal categories—have proved a powerful means of representing and managing controversial transactions. They keep reappearing within market settings to a surprising degree, even as we conventionally think of gifts and markets as largely inimical to one another. This intermixing is not a passive social process unfolding according to some inner logic of its own. Rather, innovation in exchange arises in specific cases due to the efforts of interested parties, often people who are actively seeking to leverage prevailing cultural meanings or legal interpretations to achieve some goal or settle on an interpretation of what is happening.

This article explores the role of entrepreneurial activity of this sort in the organ transplant industry, with the goal of showing how the specific case helps us understand the more general phenomenon of innovation in the shadow of the law, and the role of reciprocity and gift exchange in that process. We begin with a more general point about the connection between structures of exchange and their social legitimacy, illustrating it with a familiar current case from the (conventionally entrepreneurial) world of the "sharing economy". We then describe three innovations in the world of organ transplantation, discussing the legitimation problems faced by innovators in each case, and the strategies (sometimes highly successful, sometimes less so) they have drawn on. First, *Kidney Paired Donation (KPD)*, one of the first entrepreneurial attempts to bridge the gap between kidney supply and demand, allows patients with willing, but biologically incompatible donors, to "swap" with a similarly situated pair. Second, *Non-simultaneous, Extended Altruistic Donor* chains (or "*NEAD*" chains), removed the simultaneity constraint imposed by KPD, allowing more flexibility and a greater number of transplants, but also inserting the possibility of strategic behavior by donor-recipient pairs. Finally, we consider the most recent innovation, *Advanced Donation*, in which a donor donates a kidney before her paired recipient has been matched to a specific donor or scheduled for surgery, creating new challenges and risks.

## Innovation and Legitimation in Exchange

In its pure form, a market system has the virtue of clearly specifying the costs and gains for each particular exchange, with prices also providing a general mechanism for openly balancing supply and demand. The rules of exchange are set, there is no controversy about the goods being put up for sale, and those involved are assumed to be competent, knowledgeable, and participating of their own free will. In such circumstances, there is little need to waste time and money justifying every transaction, or fretting about what people will think afterwards.

Often, however, there is some uncertainty about one or more of these elements of the exchange. Perhaps there is confusion about what sort of transaction is on offer, or active disagreement about it. There may be a dispute about the rules that should apply to the exchange, or widespread revulsion at what is being put up for sale, or worries about who is participating, or concerns about the effects on one's reputation. Sometimes, of course, no-one is interested in the problem of wider social or legal legitimacy. It might be that the exchange is clearly illegal, everyone knows it, and nobody cares—so long as they don't get caught. But more often, at least some of the parties involved will have a strong interest in justifying their participation and avoiding social or legal sanctions. They will want to “cast” things in a form that is generally taken to be legitimate, legal, and perhaps also socially beneficial, even as they themselves benefit individually.

When investigating the sometimes convoluted arrangements people come up with in these circumstances, it is tempting to ask either “What is wrong with these people? Why won’t they just trade?”, or “What is wrong with these goods? Why can’t they just be traded?” The former approach begins from an apparent failure of people to behave in accordance with a particular theory of action, and so the analysis tends either to condemn them for their unwillingness to be rational, or search for evidence that they are secretly behaving properly after all. The latter approach tends towards a heterogeneous list of things that people have found repugnant to sell at various times, but no plausible overall explanation for why any of them are added or removed from that list. It is more productive to examine the strategies of the actors seeking to arrange a transaction, in order to see how they deal with their situations. That is, we can usefully think of people trying to organize some exchange as entrepreneurs who manage (or negotiate, or fight over) the overall understanding of what they are doing. Very often, organizing the provision of some new good or service entails trying to secure agreement on what it *is*, in some general sense that extends beyond the good itself and out to some view of the overall character of the exchange.

A large class of exchanges look *almost* like market transactions waiting to happen, except for one or two awkward elements. A payment could be mistaken for a bribe; a wage might be interpreted as a gift (or *vice versa*); a sale might provoke distaste or entail dishonor. Social scientists have documented a variety of strategies that people employ to manage these awkward exchanges, generally interpreted as cases where something in a socially sacred category (Douglas 1966) threatens to come into contact with the generally profane world of money and prices. In general, the exchange may be shut down after active reclassification or reframing (Fiske and Tetlock 1997), it may take place after substantial “relational work” to rhetorically manage its potentially negative effects (Zelizer 1978, 2005), or it may be structurally recast so the participants can plausibly claim it is not an exchange at all (Rossman 2014). It is important to note that, while the separation of spheres of exchange is sometimes rigorously enforced, in practice it is more common to see aspects of some particular "logic" of exchange appearing in places that are nominally governed by some other set of rules. Thus, the language of gift-giving might be used within a broadly market setting or a hierarchical organization, for example. Or money might be found circulating within a system that structurally enforces the imposition of gift-exchange and reciprocity between participants over time.

By their very novelty, new products and services tend to be viewed with skepticism and even suspicion, and so their classification can be a matter of ambiguity. Gaining a foothold in an established market is hard enough, but getting people to understand and accept something that doesn't seem to fit established categories is even more difficult. In these circumstances, the desire of entrepreneurs to secure a sensible (and laudable) place for their product will often draw on the vocabulary and form of gift exchange and generalized reciprocity.

## Market Disruption and the Sharing Economy

The most straightforward sort of entrepreneurial activity is competition within a well-structured setting. There is novelty, but it is at the level of the product offered. There is uncertainty, but it is at the level of success or failure with an established market. In cases of this sort, questions of interest for researchers might focus on who enters markets and under what circumstances, or on rates of success or failure across different kinds of product market, or on the predictors of business success or failure across various settings.

Institutional and cultural aspects of entrepreneurial activity can be introduced to this picture in two ways. First, there is the dynamic edge of "creative destruction" in capitalist markets (Schumpeter 1942). New products may have substantial effects on market structure as a whole. Entrepreneurial activity may create a market where none existed before, destroy existing arrangements by rendering them obsolete, or radically restructure an existing market by eating away at the shares of incumbent producers. The latter two cases are instances of so-called "disruptive innovation", particularly in the case where a new product seems initially not to satisfy the needs of most mainstream consumers but ends up taking over the market (Bower and Christensen 1995). In recent years, the term "disruptive innovation" has been more generically applied to any instance of large-scale changes in markets (somewhat to the annoyance of its originators [Christensen, Raynor and McDonald 2015]). It has typically been used in discussions of products and services emerging in the wake of the revolution in mobile computing and the associated ability of businesses to collect and harness very large volumes of individual-level data and use it to provide or broker the provision of individualized products and services to users (Fourcade and Healy, forthcoming). Companies like Uber and AirBnB are the most familiar cases of these "new disruptors", and they are only the most prominent of a slew of startups in the same or similar markets.

A second way to connect entrepreneurial activity to wider forces is by way of the problem of categorical identity within markets. Established markets provide new entrants with a well-defined field where they can establish their identity, typically in contrast to their competitors. This allows potential investors and customers to recognize them as members of a class of business that makes sense. Firms or products that fail to conform to some recognizable category are likely to face challenges in the market (Zuckerman 1999). However, this pressure towards classificatory coherence is seen not only at the level of products or individual firms, but also felt at the level of occupations and industries, and beyond that at the boundary of the market itself (Ruef and Patterson 2009). Product or service innovations that disrupt some particular market (e.g., private transportation) may create or deliberately aggravate broader knock-on effects in organizational fields more broadly, as entrepreneurs try to take advantage of various cultural, organizational, and legal ambiguities. Thus, entrepreneurship often takes place in the shadow of cultural or legal constraints. It runs in to common-knowledge expectations or seemingly explicit rules about what can and cannot be done with different sorts of goods and services, or with particular sorts of people or groups. Theories of classification and identity within markets connect in an intuitive way to the problem of managing sacred and profane transactions more commonly seen at the boundary of the market. While some misclassifications or bad identities will provoke simple confusion, others have the potential to appear repellent. They invite efforts to soothe the problem via the balm of gift-exchange or some other virtuous framing.

Consider the case of firms like Uber, Lyft, AirBnB, or TaskRabbit—members of the so-called "sharing economy" or "gig economy" often hailed as disruptive innovators challenging incumbents across a range of markets. At first glance, Uber might be classified as a transportation service employing drivers and selling transportation services to customers. This is not Uber's preferred characterization, however. An employment relationship between Uber and its drivers entails legal responsibilities that the firm would prefer not to bear. An alternative theory is that Uber hires its drivers as contractors rather than employees, and sells transportation services to customers. This interpretation entails a service market on both the supply and demand side. But this is not Uber's vision of itself, either. Instead, in a third interpretation, Uber sees itself merely as a technology company providing a mobile application that makes life easier for people who want a ride somewhere, on one side, and drivers who are happy to bring them there for a fee. It takes a cut from both sides of the relationship (and a substantially larger one from the driver side), but—on this theory—it is neither an employer nor a service provider. It is simply facilitating a form of "sharing" in a way that makes it much more efficient than previously possible (Benkler, 2004). Other interpretations of what is happening are also possible, with various interested parties pushing hard for their preferred view.

Disagreement about how to describe and classify Uber, how to establish what it "really is", have obvious consequences for its long-term viability. A regulatory or legal decision saying Uber drivers are or are not employees, or that AirBnB should be subject to the rules governing hotels, for example, could upend these firms' business models very quickly. [1] For our purposes, a striking feature of many of the most prominent and allegedly disruptive services is their embrace of the imagery and logic of gift exchange and reciprocity. The rhetoric of the so-called "Sharing Economy" presents the entrepreneurial firm as a facilitator of co-operative exchange between both peers and strangers. Nominally, the firm facilitates exchange by enabling trusted matches for services. You were raised not to let strangers into your house, or go into the houses of strangers, but AirBnB invites you to do one or the other in a convenient and profitable way. Your parents also warned you not to get into strangers' cars, but Uber lets you do so easily and at a reasonable cost. A world of shareable items, previously accessible only through the effective but cumbersome social mechanisms of personal networks and direct trust is thus unlocked for general use, with the brokering firm taking a piece of the profits.

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[1] As of this writing, a number of suits on this question are working their way through the courts. See, e.g., O'Connor, et al., v. Uber Technologies, Inc., Case No. 13-cv-03826-EMC, U.S. Dist. Ct., N. Dist. Of Cal. (filed Aug. 18, 2016).

Employing the language of gifts and sharing is not a magic spell. There is no reason to expect that people will be convinced. Indeed, the language of sharing and social capital used to pitch these services has already been the subject of considerable skepticism (see e.g. Slee 2016), and even satire in TV shows like *Silicon Valley*, where the claim that some bit of software is "making the world a better place" is a running joke. The criticism of these firms is that their embrace of the language of sharing in exchange is merely a bit of cynical window dressing, a fig leaf meant to rationalize a much more straightforward effort to avoid the legal, regulatory, and perhaps moral obligations that would come with simply admitting what the business "really" does. One reason for this is that, at bottom, the for-profit provision of car rides or places to stay is just not very controversial. No one thinks that it should be illegal to offer these services, or that it is morally wrong in some deep sense to put them on the market for sale. The result is that the language of sharing and reciprocity is much more likely to seem merely rhetorical. At this end of the spectrum, the worry is not that the products are dangerous or transgressive in some deep moral sense, but rather that they are in some sense cons. And so the rhetoric of sharing tends to fail. Entrepreneurial efforts to introduce gift-like rhetoric into uncontroversially market-like structures tend to lack plausibility. What about the reverse case, where the aim is to introduce a more market-like structure into a setting dominated by gift-based rhetoric? This is the world of Organ Entrepreneurs.

## Organ Entrepreneurship

As we noted at the outset, there is no production market for human organs. Their sale is almost always a criminal offense. Supply flows from voluntary donations, sourced either from deceased donors or from living donors who are usually related to the recipients of their donations, but sometimes not. Modern transplant systems are governed by a logic of gift-giving for deep historical reasons. At the beginning of the modern transplant era (in the 1960s and early 1970s), the remarkable medical advances that made transplantation possible also provoked considerable public skepticism, and even fear. Transplantation seemed to create disturbing incentives for doctors to intervene at the moment of death in ways that were morally transgressive. Decisions regarding deceased donation were (and are) made by family members at the worst possible time—generally when confronted with the sudden death of a loved one. The later development of living kidney donation avoided some of these problems, but still constituted a risky procedure that necessarily involved an invasive violation of bodily integrity.

As a result, transplant professionals worked to reclassify a transaction once viewed as a ghoulish violation of nature and God's will into a valued and selfless "gift of life" that emphasizes both the satisfaction derived from charitable giving and the social and moral obligations owed to our neighbors (Healy 2006). As a result, transplant professionals are highly attuned to social norms and public opinion regarding organ donation and, in particular, to transactions that might be perceived to degrade this priceless gift. In practice, the transplantation system lacks the direct reciprocity of a true gift exchange structure. Most donors and donor families never meet "their" transplant recipients, although compelling cases sometimes make the news. Even so, the social imaginary of the gift—the cultural forms and rhetoric of selfless giving, of moral obligation, and communal responsibility—remain crucial to the success of modern transplant systems (Healy and Krawiec, 2012).

Since the 1980s, medical advances continued to make transplantation a safer and more routine procedure, even as the structure of the supply system remained more or less the same. Perhaps predictably, the result is a severe shortage of transplantable organs, particularly of kidneys. The kidney wait list currently stands at over 120,000, with more added each day. (U.S. Department of Health and Human Services). And the list would be longer were it not for the fact that roughly 5000 people on the waiting list die each year and thousands others are removed from the list after becoming too sick to transplant. Meeting current need would require more than doubling the current rate of transplants. (Cook and Krawiec, 2014).

This pressing and dramatic need has brought forth a variety of entrepreneurial responses. The most interesting of these involve efforts to introduce market-like (or, at a minimum, incentive-based) structures in the face of market, legal, reputational, social, and religious constraints not faced by entrepreneurs in other fields. Most obviously, legal prohibitions on organ sales foreclose the most common means of addressing a shortage of supply—the marketplace. But this barrier has also spawned creative methods for incentivizing and facilitating kidney donation, improving organ matching, and promoting cooperation among transplant facilities that otherwise operate as competitors. In large part, the law both constrains and encourages innovation in this sphere by forbidding organ sales without defining what constitutes a sale.[2] The result is a variety of barter and "barter-plus" arrangements that straddle the line between gift and sale. Entrepreneurs in this area thus face the inherited weight of an established and highly successful "cultural account" of donation that emphasizes the moral qualities of the gift of life.

## Early Kidney Exchange: Kidney Paired Donation (KPD)

One of the first entrepreneurial attempts to bridge the gap between kidney supply and demand in the face of restrictions on compensation for organ donation was kidney exchange, an innovative mechanism that seeks to overcome barriers to related-party exchange stemming from immune-system or blood-type incompatibility. (Rapaport, 1986). About a third of ESRD patients with a living, willing donor will be incompatible with that donor. (Leeser, 2012) Kidney Paired Donation ("KPD") arose as a method to allow these patients to "swap" their willing donors when the donor from one pair is a match for the patient in another and vice versa.

But kidney exchange is a different and more complicated transaction than the traditional deceased and living donations that preceded it. In addition to medical, logistical, mathematical, and (as we will discuss) legal hurdles, a rationalizing account to generate social buy-in was needed. What sort of exchange was this and why should people accept it?

The "gift of life" metaphor, successfully employed by the transplant community to gain social acceptance of transplantation since the 1970's, was again called into service. But already, tensions between the metaphor of gift and the increasingly complicated business of transplantation were visible. A living donor who simply donates her kidney to an intended recipient, as under a traditional living-donor arrangement, receives only the satisfaction of

[2] The National Organ Transplant Act (NOTA) prohibits the knowing acquisition, receipt, or transfer of "any human organ for valuable consideration for use in human transplantation if the transfer affects interstate commerce." 42 U.S.C. § 274e(a).

helping another.[3] The gift metaphor maps nicely onto such transactions and, as a result, NOTA's prohibition against the exchange of "valuable consideration" is not implicated. In the case of traditional organ donation, then, the gift imagery fluidly tracks the legal regime, framing and motivating the goodwill necessary to participate in organ donation.

But paired exchanges are not gifts in either the colloquial or legal senses of that term. When a KPD donor promises to transfer her kidney to a designated recipient in exchange for a compatible kidney for her loved one, both the donor's promise and that of the "swapping" donor are undertaken for the purpose of inducing the other party's promise. Such a bargained-for exchange satisfies the common-law contract requirement of consideration and raises the question of whether "valuable consideration" has been received in violation of NOTA §301. (Healy and Krawiec, 2012)

In the early days of kidney exchange, both the transplant community and legal opinion were divided as to whether KPD violated NOTA. Some transplant centers, in the belief that in-kind exchange did not violate NOTA, engaged in KPD, whereas other, more risk-averse, centers did not. Despite the legal ambiguity, the number of KPD exchanges increased each year, as did the number of publications, conferences, and meetings dedicated to developing and expanding on the idea. (Ellison, 2014) In 2007, Congress resolved the legal issue definitively, by passing the Charlie W. Norwood Act, which amended NOTA by adding a single sentence: "The preceding sentence [barring valuable consideration] does not apply with respect to human organ paired donation."[4] In the accompanying legislative history, numerous members of Congress emphasized their belief that the Norwood Act was unnecessary to exempt KPD from NOTA, further demonstrating both the ambiguity in the statute and the uncertainty surrounding the nature of KPD itself. (Krawiec and Rees, 2014)

[3] When the gift is to a loved one, more tangible benefits may accrue. For example, the donation may enable a spouse to escape dialysis and return to work, providing economic benefits for the family unit.
[4] Charlie W. Norwood Living Organ Donation Act, 110th United States Congress, Dec. 7, 2007.

## Progress and Complications: NEAD Chains

As should be clear from the prior section, debates over KPD and the Norwood Act did not resolve the inherent legal and cultural ambiguity as to what sort of transaction kidney exchange was and how it fit within the "gift of life" narrative that had underpinned transplantation since its outset. Moreover, almost as soon as the ink was dry on the Norwood Act, new innovations in transplantation arose that arguably further removed transplantation from the gift narrative and were not addressed by Norwood, because they were unforeseen at the time of the legislation.

One such innovation is the Non-simultaneous Extended Altruistic Donor (or, NEAD) chain. Although KPD can be extended to permit the simultaneous exchange of three or more incompatible pairs, the need for simultaneous exchange is a practical limiting factor on the size of any single KPD transaction. Simultaneity ensures that no donor can back out in the middle of the exchange — either everyone donates at once or no one does. The downside, however, is an increase in logistical hurdles. All participants must be healthy enough and available for surgery at the same time, and each individual in the swap requires her own surgical theater and team, either to remove her kidney or to transplant her with a new one. As a result, KPD consisting of large numbers of simultaneous swaps – while possible in theory – are rare in practice.

The NEAD chain arose as a means to increase the number of transplants possible through any single exchange transaction and to add flexibility to kidney exchange practice, by removing the need for simultaneity. NEAD chains leverage the small number of non-directed living kidney donors, who give a kidney without having a particular recipient in mind, by beginning a chain of donations with a kidney from a non-directed donor. With this "extra" kidney in the system, the transplants do not need to take place all at once. Instead, a patient can have her donor pay it forward later—say, when another suitable patient-donor pair is found.

But this lack of simultaneity introduces a new wrinkle into kidney exchange by allowing for the possibility of strategic behavior. Would-be donors who promise to donate a kidney as part of an exchange transaction may renege on the deal after their loved one has received the bargained-for compatible kidney. How does this possibility fit within the gift narrative?

NEAD-chain donor reneging is considered an acceptable risk because there is no direct harm to other chain participants from a donor who backs out. Compare this to the situation in KPD: If KPD were nonsimultaneous and the exchange broke down after a donor-patient pair had donated a kidney but before they had received one in return, then the pair could potentially suffer an irreparable harm. Not only has the pair not received the promised kidney, but they now have lost their healthy kidney and thus the opportunity to participate in another kidney exchange. They no longer have anything to offer. The breakdown of a NEAD chain does not come with such dire consequences, however. If the chain breaks down midway, the remaining donor-patient pairs lose the promised transplant but, because they have not yet donated their healthy kidney, they are in no worse of a position than before they started.

It should be noted that NEAD chain donor reneging is extremely rare, but not unheard of. It would seem that the cultural account of the gift of life, combined with the screening practices of transplant centers engaged in kidney exchange, is largely sufficient to induce performance. But the time delay in NEAD chains, and the accompanying possibility of reneging, invite consideration (and, ultimately, rejection) of a time-honored market-based guard against reneging — the use of formal contracts to bind performance. Ultimately, enforcement hurdles, ethical concerns, and transplant professionals' discomfort with inserting lawyers and legal complexity into the transplant setting have meant that formal contracts are not employed to address NEAD chain donor reneging. As discussed in the following section, however, a new transplant innovation, advanced donation, combines gift and market exchange even more aggressively, introducing market elements, such as time delay and nonperformance risk, along with a new variation on the gift of life model, the "gift certificate."

## Advanced Donation

A new transplant innovation – the advanced donation program (ADP) – further blurs the lines between gift and market exchange by introducing several mechanisms familiar to the marketplace. First, ADP introduces a present investment — a healthy kidney — by a donor who has an expectation of future return in the form of a compatible kidney for a friend or loved one. This temporal separation of obligations leaves the donor potentially vulnerable to nonperformance. This vulnerability is (partly) addressed through a second ADP innovation, a time-honored method for dealing with such intertemporal risk: an explicit (albeit, probably inadvertent) contractual agreement in the form of consents to participate in ADP. (Krawiec, Liu, and Melcher, 2017) At the same time, ADP relies explicitly on the gift imagery that has always characterized organ donation, expanding the gift metaphor to include the modern "gift certificate" concept.

As explained in the prior section, NEAD chains present a risk of donor reneging, but without posing harms to any specific chain participant. This is because NEAD chain intended recipients are transplanted before or simultaneously with their paired donor's operation. This means that, even if someone backs out of the chain, no donor-recipient pair is left worse off than they were before they joined the program. Although the intended recipient is still in need of a transplant, her paired donor has not donated and still has two healthy kidneys. Assuming that another match can be found, the pair can always participate in a different chain or swap.

In contrast, by reversing the usual order of donation, ADP carries the risk of individual harm. ADP arose from the recognition that donors often have time constraints. Sometimes those constraints are minor, as when a schoolteacher would prefer to donate over the summer when school is not in session, or when military personnel can only donate during leave, ensuring sufficient time for recovery prior to redeployment. At other times, the time constraint is more significant, as when a grandfather would like to donate now, because he fears that by the time his young grandson experiences kidney failure, which could be a decade or more away, his kidneys will be too old to enable a valuable NEAD chain or ADP trade. (Flechner, et. al, 2015). By providing a "gift certificate," ADP allows these and similar donors to donate *now*, in exchange for a "prioritized opportunity" for their designated recipient to participate in a future kidney swap. There is no guarantee that a compatible kidney will be provided, however, and a host of intervening events could prevent the transplant from taking place. For example, a compatible donor may not be found or may be found only after great delay. Moreover, for gift certificates with a long anticipated time to redemption, there is no guarantee that the matching program will even be in existence when the intended recipient is ready for a transplant.

For our purposes, ADP is particularly interesting for its innovative combination of market and gift elements. The "gift certificate" analogy relies on and extends the gift of life metaphor to an item that is both familiar and associated with altruistic gift giving. And, at one level, this extension makes sense. To the extent that the gift metaphor was a useful imagery for understanding KPD and NEAD chains, the same logic should hold for ADP. Only the order of "giving" has been reversed, and not the act itself.

At the same time, while ADP entrepreneurs have wisely invoked the "gift certificate" metaphor most frequently, ADP has also been referred to as a "layaway plan" or "voucher." (Rivero, 2016) And these analogies make sense as well, reflecting ADP's status as a mix of both gift and market elements (as were the KPD and NEAD exchanges that preceded it). Indeed, in many ways, ADP represents a more mature "market", one in which donors invest upfront with an expectation of a (risky) future return.

As already noted, the riskiness of this "investment" subjects donors and recipients to a nonperformance risk that other organ innovations have avoided. But ADP also relies – unlike KPD and NEAD chains – on formal, though likely inadvertent, contracts (in the form of consents to participate in ADP) that define the parties' obligations to one another.

In another setting, this fact would surely pass unnoticed. Contracts are, after all, a ubiquitous feature of markets and one that is widely believed to facilitate exactly the type of costly and irreversible investment required of ADP donors (North, 1990, Clague, 1999). Yet the logic and imagery of gift, on which kidney donation has always relied, combined with widespread distaste for formal contracts in the transplantation setting, make the use of formal contracts in ADP an important innovation, and one that has already generated debates in the pages of transplantation journals and law reviews. (Flechner, et. al, 2016; Liu, Krawiec, and Melcher, 2016)

In short, although it may be useful to think of ADP as a next-generation gift exchange, employing the familiar gift certificate concept, ADP is also the next step in the evolution of the exchange of a single good — a kidney for transplantation. That trajectory is one from a pure gift (traditional kidney donation), to simple barter (KPD), to exchange with a temporal separation of obligations that relies solely on trust and reputational constraints for enforcement (NEAD chains), to a complex matching market in which the parties rely, at least in part, on formal contract to define and clarify their obligations to each other (ADP).

## Conclusion

ADP represents only the most visible of recent entrepreneurial activity in the world of organ transplantation. The combination of a vague legal prohibition and severe scarcity almost certainly ensures that the pace of entrepreneurial innovation in organ transplantation will continue unabated or even accelerate. Although the focus in medical journals and the popular press is frequently on the medical and scientific discoveries that facilitate advances and innovation in organ transplantation, entrepreneurial efforts directed at cultural framing and organizational innovation are clearly also a key feature of change in this area.

Modern transplant systems are governed by a logic of gift-giving for deep historical reasons. Yet that gift logic has proved quite adaptable. Not simply an impediment inherited from a previous exchange regime, it continues to serves an important purpose even as kidney transplantation increasingly embraces markets structures quite explicitly. Innovation, particularly innovations that have the potential to disrupt shared understandings about legitimate transactions, are often accompanied by attempts to depict the new state of affairs as reassuringly similar to an existing product, service, or form of exchange. But with controversial transactions such as organ transplantation, those efforts are often also designed to demonstrate that a potentially controversial transaction serves morally valuable ends. Gift exchange has long been a powerful means of representing and managing these controversial transactions, and continues to be so (Healy and Krawiec, 2017)

This process of expectation management does not arise of its own accord. Rather it is the result of the deliberate effort of interested parties. The process is two-sided, in the sense that efforts to socially legitimate or legally reclassify exchanges are not guaranteed to succeed. The work of organ entrepreneurs demonstrates the more general phenomenon of innovation in the shadow of the law, and the role of reciprocity and the logic of gift exchange in that process.

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