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Forging a fit between technology and morality: The Dutch debate on organ transplants

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Because technologies and morals co-evolve, modern societies have to become adept at techno-moral learning, or the art of 'reflective' co-evolution. Developing this skill requires a better understanding of the various ways technology and morality challenge each other. With this aim in mind, we analyse the history of the Dutch debates on organ donation, showing how moral considerations enabled the development and application of transplantation technology. We argue that moral principles like bodily integrity and self-determination have proved to be very robust—so much so that they contribute to the scarcity of donor organs and so frustrate the full application of the transplantation technology. This 'moral stand-still' has led to technological experiments aimed at resolving this scarcity and to the reinterpretation of aspects of morality that seem more flexible than the principles of bodily integrity and self-determination.

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1. Introduction

Technologies help change the societies in which they are introduced, and in the process are changed themselves by societal pressures. What is not always appreciated, though, is that this co-evolution of technology and society [1] does not halt at the door of morality. Emerging technologies in particular often uproot established moral routines, causing techno-moral controversies over the question of how to re-establish a 'fit' between the technology and our morals [2].

Such a fit can be established in essentially two ways. On one hand, the technology can be outlawed or redesigned to fit current morals. For example, in the Netherlands many object to the creation of embryos for the purpose of producing stem cells. The ensuing moral (and legal) blockade stimulated scientists to look for technological solutions to create "stem cells without moral pain," as the Dutch Health council dubbed them [3], for example by 'deprogramming' adult somatic cells into pluripotent cells. On the other hand, a technology–morality fit can be forged through moral change. At the time of its introduction, the contraceptive pill was condemned for disrupting key elements of sexual morality, such as (female) chastity and the 'natural' gender hierarchy. By now, partly as a result of the pill, sex without reproductive purposes has become widely accepted, female chastity is no longer thought to be particularly virtuous, and an ethos (if not practice) of gender equality has replaced the natural hierarchy of the sexes.

In this article we present a case study of techno-moral change: the ethical and legal debate in the Netherlands on the issue of organ transplantations. This debate provides a particularly instructive instance of techno-moral change, because to the present day it has not produced a satisfying closure. This gives us ample opportunity to study ongoing negotiations.

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In Section 2 we show how the evolving technology of organ transplantation caused moral concerns that were either solved by developing new norms or through technological innovation. However, as we argue in Section 3, in one key respect the success of the technological innovation created a moral issue that it could not solve. In Section 4 we discuss the technological and moral byways that have been constructed to find a way around this moral standstill. Section 5 offers concluding remarks.

2. Early debate in the Netherlands: moral and technical issues

In the Netherlands, the organ transplant debate did not immediately start when the first successful kidney transplantation was performed in the U.S. in the 1950s. The first heart transplant in 1967 had a bigger impact on society [4,5]. It received considerable media attention, creating, in the words of Page, “a circus-like splendour” [6]. The first kidney transplant in the Netherlands was performed about the same time, in 1966, and this time the organ transplant debate in the Netherlands escalated. Thus the debate took place when organ transplants were an established medical fact and kidney transplants from living relatives were no longer considered experimental [7]. The new medical technology provoked several moral concerns.

Focusing on these concerns allows us to highlight some examples and mechanisms of techno-moral change. But we begin with a potential concern that turned out to be absent, at least in the Dutch context.

2.1. Moral beliefs

Should organ transplants be performed at all? One ethical objection centres on the integrity of the human body. In some religions, this integrity is deemed important because of the need to be intact on Resurrection Day. However, in the Netherlands no one opposed organ transplantation on religious grounds.¹ Nor did we find the well-known rhetorical question: “Does medical science go too far?” [8] playing a role in the debate.

The immediate acceptance of organ transplants exemplifies a belief in progress, typical for many ethical debates in the Netherlands at that time. At this point Prometheus, patron saint of technological progress, ruled supreme in the Netherlands. The worst thing was to be considered a conservative.² Historian James Kennedy points out that the Dutch political elite, confronted with a rapidly changing society in the 1960s, never attempted to stop the changes (citing examples of changing views about abortion, recreational drugs, euthanasia, and pornography) [9]. Instead the elite tried to ensure that these changes would take place in an acceptable manner—in the process creating one of the most tolerant societies in the world.

2.2. “Can” implies “ought”

Another moral issue was whether patients were morally entitled to have a transplant [11]. The issue was framed in deontological terms of a “duty to help the sick.” It is one of the foundations of modern morality that *ought* implies *can*. We should not forget, however, that the reverse can be equally true. When technology enables us to do certain things, morality can start obliging us to do so; sometimes *can* implies *ought*. Organ transplantation is such an example: now that technology has created the possibility of helping, morality requires us to do so [12]. Technology thus induced moral change by helping to create new rights. As a consequence, kidney transplants were included as part of insurance coverage as early as 1971 [13].

However, for a long period, the issue did not attract much attention because transplantation was viewed as a marginal technique [14]. Indeed, by 1969 only 2347 kidney transplants were registered worldwide [15]. Because everyone expected the demand to remain modest, there was little need to discuss moral entitlement. But over time, further technological progress changed this situation.

2.3. Moral path-dependency

The next issue concerned not the receiver of the organ but the donor. One can extract kidneys from living donors, but hearts and livers may only be retrieved from dead bodies. Can doctors be allowed to cut up bodies so as to ‘harvest’ organs? The question was a new ethical and legal issue. Since no specific legal rules existed, in 1968 the Netherlands State Secretary of Health established a special Health Council Committee. Before the Council could publish its report, however, several lawyers suggested a pragmatic, temporary solution: why not apply the rules already in place for post-mortem examinations? Those rules held that a post-mortem examination was acceptable if:

(a) the deceased had requested this in his last will or any other document;

¹ In fact, Pope Pius XII endorsed organ donation in 1956 [10, p. 40].

² This does not seem to be a particularly Dutch phenomenon, however. Page notes that at the end of the 1960s the right to be sceptical about transplant operations had fallen into abeyance [6, p. 858].

- (b) absent the deceased's request, his or her relatives had granted consent for a post mortem;
- (c) the district attorney (the Dutch equivalent) thought a post mortem was necessary to establish the truth regarding the deceased's death (i.e., if there was suspicion of foul play);
- (d) it was deemed necessary for public health reasons (e.g., if death was due to a contagious disease).

It is interesting to note that in defining a solution to the issue of harvesting organs, the lawyers never considered ordering an organ transplant from a dead body for public health reasons (Rule d). Apparently, they felt that saving the lives of heart, kidney, or liver patients did not qualify as a public health matter. Occasionally they considered making use of the suspicious death rule (c). Should not saving a life with a harvested organ be deemed just as important as a criminal investigation [16–18]? That idea did not receive much support either. But the other two rules of post-mortem law were adopted as the best solution for the moment: taking organs from a dead body would be deemed acceptable if the deceased had granted consent when he was still alive (Rule a), or if his relatives had consented on his behalf (Rule b).

This issue, and its (temporary) resolution, is an example of a regular phenomenon that occurs when emerging technologies necessitate moral change: new norms are derived from established norms already regulating issues deemed similar to the emerging one. We call this phenomenon *moral path-dependency*.

In 1969 the Dutch Red Cross proposed an alternative solution: a no-objection or opt-out system [19]. Both systems had already been suggested in 1960 with regard to corneas [20], but neither was taken seriously. Most parties agreed that for the time being, the provisional solution was preferred as most in line with established moral and legal routine. The principled choice was postponed to a time when a new law covering all aspects of organ transplantation, including living donors, would be drawn up [21]. Except for the Social Liberal Party D'66, all political parties expressed their preference for the consent system.

In 1975 the Health Council finally published its long-awaited report on organ transplants. The Council suggested a no-objection formula, because it would educate citizens with regard to organ donation so citizens would come to see organ donation as something one should do for one's fellow human beings as a matter of course. The position of the Council was motivated by concerns for the greater good, and by a concept of justice that demanded that organs should go to those who needed them. An additional deontological argument, reminiscent of Kant's categorical imperative, claimed that many people would like to have an organ transplant if it could save their own life or health, so the reciprocity principle was at stake [22].

But this third suggestion for change to the consent system also failed because the Council lacked the authority to effect change. By the time its report was published, the temporary rules adopted previously had acquired the elevated status of 'the right principle,' 'the proper solution.' When asked the question "Can we take organs from a dead body?" the first answer: Yes, we can, but only if the deceased or his relatives have granted consent to do so, now seemed infinitely more acceptable than the second answer: Yes, we can, unless the deceased has registered an objection to this procedure.

2.4. Value-laden re-descriptions

Yet another moral issue regarded the concern that people might be pronounced dead before they actually were dead, just so doctors could remove their viable organs. There was some cause for this concern because organs have to be taken out before all bodily functions have stopped.

A solution was found in a new definition of 'death,' which sought to satisfy both the need for ensuring that the donor was truly dead, and the need for the organs to be fit for transplantation. This solution is the "brain-dead criterion," introduced and explained by a committee from Harvard University in 1968, and imported to Europe soon after. It is a perfect example of how new technologies can cause value-laden re-descriptions. Whereas the older norm stated, "It is forbidden to take organs out of a body that still shows signs of life," the new norm was redefined by the new medical technology. An additional procedural guarantee was formulated to ease popular concerns. The doctor who pronounced the potential organ donor dead could not be the same doctor who would perform the organ transplant operation [23]. This measure was deemed necessary in order to safeguard potential organ donors, and to bolster people's willingness to donate.

2.5. Solution by technological innovation

The previous moral concerns raised by new medical technologies were solved by developing new norms or redefining existing ones. Thus, a technology–morality fit was achieved by modifying morality. But we also found an example of the reverse: the modification of technology.

In the early years of organ transplantation, a tone of optimism dominated the medical journals. But from 1971 onward, the so-called "year of disillusionment" [11], people took a more sceptical view. There were more negative transplantation outcomes because of (a) failing tissue types, (b) the inability to improve conservation techniques, and (c) graft rejections. These technological failures raised a new moral concern: was this new technology worth the trouble? If the chances of success were slim, or if the quality of life after receiving a transplant remained low, was it morally acceptable to ask sacrifices of donors or their relatives? Was the money for transplant operations well spent, or were there better alternatives?

These moral concerns were not solved by debate but by technological innovation. The introduction of the immunosuppressive drug ciclosporin in the beginning of the 1980s [24] paved the way for organ transplantation to go forward. Organ rejection was and remains the main reason why transplantation fails [25]. Ciclosporin helps reduce this problem. Thanks to this technological breakthrough, transplantation developed into a fairly successful remedy for certain diseases instead of an *ultimum refugium* for those who would otherwise die.

3. The moral robustness of the consent system

3.1. Organ scarcity in the 1980s

In Section 2.3 we showed how, starting as a temporary solution, the consent system quickly became rooted in Dutch society. The moral cost of this system—that it probably generated few organs for donation—was deemed acceptable because organ transplant operations were rare at that time anyway. Thanks to technological innovation, however, this situation changed. Ciclosporin so markedly improved the survival rates for transplant patients that kidney, liver, and heart transplantation moved to the therapeutic stage. From that point on, an ever-increasing number of patients awaited a transplant. The earlier issue about a claim right to an organ—then dismissed as premature—was now rekindled and answered in the affirmative [25].

But although the demand grew, the supply did not. There were far fewer potential donors, and many of their relatives refused to donate when the moment arose. The new technological reality thus put considerable pressure on the consent system. And since the invention of ciclosporin, the consent system has been under almost non-stop attack by proponents of a no-objection system. During the 1980s and into the 1990s, several reports were published by influential organizations in the healthcare policy field, all advocating the no-objection formula. The Royal Dutch Medical Association spoke in favour of it, as did many scientists, because moving to this system was seen as the only plausible way to relieve some of the organ scarcity [14,26–29]. These arguments failed to generate much political support, and in 1991 the Organ Donation Act was sent to Parliament. The bill was based firmly on the consent principle [30], which had broad Parliamentary support [31].

A possible explanation for the lack of support for the no-objection system is that in the 1980s medical scarcity was a fact of life. During the economic crisis at the time Dutch healthcare was rationed all around: there were overall macro budgets for the entire health sector, and there were sickness fund budgets and hospital budgets. Waiting for medical treatment was considered normal. Doctors were forced to triage between patients: first according to medical need, second the patient who had waited the longest. When it came to organ transplantation, some additional criteria were formulated: the donor organ should not be ‘wasted,’ i.e., one should look at blood and tissue types to find a matching recipient; and one should not give good livers to unrepentant alcoholics.

Circumstances changed in the mid-1990s. In the new period of economic growth and prosperity, scarcity in healthcare was no longer acceptable. The general feeling was that patients were entitled to proper and timely treatment, including an organ transplant operation if needed. Accordingly, in 1995 several parties in Parliament announced that they had changed their opinion and now declared themselves proponents of the no-objection system. A Christian Democratic member of Parliament stated, “We don’t belong to ourselves, we belong to each other” [32]. Another member declared that it should be normal to think about donating one’s organs.

Again the move to change failed. MPs in favour of the consent system referred to Article 11 of the Constitution: “Everyone shall have the right to inviolability of his person, without prejudice to restrictions laid down by or pursuant to Act of Parliament.” The argument that “we belong to each other” was hotly contested in public debate. “The human body does not belong to the state” were the words of a liberal member of Parliament [33]. Many argued that the no-objection system infringed on the right to self-determination. MPs favouring the consent system pointed out that relatives should have a say since the decision to donate would have important consequences for them. Also relatives were deemed able to decide in the spirit of the deceased, more so than a doctor.³ An MP of a small Christian party approved of the consent principle because other values, such as the value of giving freely, are important too. According to the Minister of Health,⁴ “Legally presupposed solidarity goes against Dutch nature.” This is, of course, debatable, but opinion polls showed that a majority of the public favoured the consent principle [25,35]. Opponents of the no-objection system further argued that there were better alternatives for enlarging the donor pool. In the end a surprising 147 out of 150 members of Parliament voted in favour of the organ donation law with the old consent system enacted as part of it [36].

But the debate did not stop there. A new round of debate began after re-evaluation of the law in 2004. During that time, a broad coalition of societal parties, including several patient organizations and academic hospitals, spoke out in favour of the no-objection system, but again it failed to get sufficient Parliamentary support [37,38].

³ Advocates of the no-objection principle also claim to make their decision with the interests of the relatives of the donor in mind. In their view, relatives should not be bothered with the donor question when their relative has just died, the adoption of a no-objection system would spare them a difficult choice at a tragic moment in their lives.

⁴ The Minister of Health was Els Borst-Eilers at the time. The fact that she proposed the consent principle is remarkable, considering that she was vice president of the Health Council and chairman of the Transplantation Commission of that Council when the transplantation report was published in 1987 advocating the no-objection system. She was also a member of the Social Liberal Party D’66, which advocated the no-objection principle very early in the debate [34].

In 2008 history repeated itself for the last time when the Dutch Coordination Group Organ Donation proposed that the consent system be replaced by an Active Donor Registration system [39]. Citizens would be encouraged repeatedly to register either as a donor or non-donor. Citizens who failed to register after having been reminded several times would be registered as donor [39]. In effect, the Active Donor Registrations system resembles a no-objection system.⁵ In the end, however, the Minister of Health made it clear he would not follow the Coordination Group's recommendation to change the system [40].

3.2. *Moral robustness*

Even in an era when medical scarcity is unacceptable, as from the 1990s onward, the majority remains stubbornly opposed to the no-objection system, although it seems to be the best opportunity for alleviating organ scarcity. This means, then, that the moral principles favouring the consent system are really robust. The rules regulating organ donation, originally derived from the rules regulating post-mortem examination, rest on the principle of the sanctity of one's body and on the principle of self-determination. Almost everybody in the Netherlands agrees on the importance of these principles. Nobody contests the right to self-determination. Even proponents of the no-objection system admit that the consent system serves this important right best and if there were no organ shortage they would be in favour of the consent system [29,41]. Henk Leenen, the founding father of Dutch health law, argued in 1988 that the government would need very strong arguments to restrict the right to self-determination, especially with regard to the intimate sphere of a human being and his physical and mental integrity [41]. Organ donation touches upon a person's integrity in a fundamental way. Because of the strong basis of this right, it was and is very difficult for proponents of the no-objection formula to change the consent formula, which in the general view best protected the right to self-determination. Ad Lansink, a member of Parliament for the Christian Democratic Party, also identified the importance attached to this right, especially following the 1970s discussion on Article 11 of the National Constitution: "Because of that, the self-determination and integrity point became emphasized very strongly. Every discussion about it became very difficult. That is a burden we have to bear" [32].

In contrast, the no-objection system draws primarily on the principle of benevolence. In the Dutch predominantly liberal culture, 'negative' principles that aim to protect individuals from harm typically have the upper hand over 'positive' principles that aim to maximize the collective good—even if this means that organs cannot be used to help others.

4. A standstill in the search for moral and technical solutions

The debate on organ transplantation has not reached closure because no successful fit has been forged between morality and technology. The feeling remains widespread that people ought not to die on a waiting list, and that doctors, politicians, or transplant boards should not be forced to choose among potential recipients. But in the end the moral principles of the sanctity of the body and of self-determination always take priority over the right of patients to be provided with donor organs. The scarcity issue remains unsolved because the necessary moral change is deemed out of the question. Hence, people try to find new ways to work around the present moral standstill by proposing new norms and/or technologies.

4.1. *Public information*

One solution to the dilemma is if more people voluntarily registered as a donor. In that way the moral principles of bodily integrity and of self-determination would be respected, as well as the moral principle that orders us to help those who are waiting for an organ transplant. But an evaluation of the Organ Donation Act in 2001 concluded that there was ample reason to doubt the effectiveness of information campaigns so far [42]. In 1995 less than one-quarter of the population had a signed donor card [32]. Today a little over 5 million Dutch people (out of 17 million) have registered their wishes regarding organ donation (www.donorregister.nl). This disappointing number has led some to argue in favour of a more persuasive method for informing the public. Several parliamentarians have argued that public information should no longer be neutral but should be explicitly positive [43]. Similarly, the Minister of Health said that a public campaign should appeal to people's solidarity and self-interest, since many may find themselves on a transplantation list some day [32].

However, this solution implies downplaying another well-established moral principle: the government should always provide its citizens with neutral information because either positive or negative information risks misinforming the public. Indeed, analysing the information currently available to the Dutch public, we found there is considerable positively coloured information around. People who are determined to learn every detail *can* get that information by looking on the Internet or by ordering brochures. But people who read only the leaflets that are spontaneously offered to them get a different view. For example, the most recent publication "Fairytale and Facts about Organ Donation," [44] is a good illustration of providing information with a positive nature. The leaflet announces that the donor looks the same after the operation as before, which is blatantly false. A donor may look pale after an operation, and there may be visible scars. After donating skin, it is necessary to wear long sleeves and trousers, and shirts with a V-neck are not an option. There are visible changes after donating corneas as well [45].

⁵ In contrast to the proposed system, in a no-objection system, citizens are not asked to register a 'yes'. Yes is the default position.

4.2. Reciprocity

As another way to resolve the dilemma of respecting both the donor's and the patient's rights, some have proposed changing the distribution system by applying a form of reciprocity. This solution too would imply moral change, because as yet one's right to receive has no relevance to one's willingness to donate. In the proposed system, people who indicate their willingness to donate by filling in the appropriate form would have preference over people who did not complete the form [46,47]. Such a system has existed in Singapore since 1987 [25]. Not only is it considered a matter of distributive justice that those willing to give are the first to receive, but the hope is that this principle will help diminish organ scarcity by motivating more people to register as a donor. In 2005 the Dutch Minister of Health Hans Hoogervorst, after talking to some people in the field, stated:

They told me that they find it problematic that there are large groups in society who because of honourable, principled reasons are not prepared to donate their organs, but at the same time do not have principled objections to receiving organs. This could be on religious grounds.... I do have a problem with that. That seems contradictory. Therefore I am a proponent of [a system of reciprocity], although there are practical problems. [48,49]

In the media Hoogervorst further stated that he was thinking in particular of Muslims [50]. By adhering to this view, the minister tried to turn a previously private decision (becoming a donor or not) into a public one.

But this change has proven difficult to realize. Both the Dutch government and Parliament have rejected the reciprocity principle on the grounds that it would conflict with the notion of equal right to healthcare and with the notion that organ donation should be voluntary, not coerced by some practical necessity [51]. Almost all political parties spoke out against such a system because they felt it would introduce discrimination in the healthcare system. Also there was fear it would be the first step down a slippery slope—smokers and the obese would be the next categories obliged to wait longer for medical treatment [50]. The Royal Dutch Medical Association and the Dutch Transplant Foundation spoke out against as well. The gay community pointed out that such a system would put gay people at a disadvantage since they are explicitly asked not to donate because of possible HIV complications [52].

Although the distribution system already includes several non-medical criteria,⁶ according to many, adopting the reciprocity criterion would go one step too far. Healthcare lawyer Martin Buijsen pointed out that such a system would intertwine two spheres of justice—the sphere of contribution and the sphere of distribution. In his opinion such a mix-up would harm the healthcare system that was built on solidarity [54].⁷

The Minister of Health promised Parliament that he would get back to this subject, and he would formulate an official cabinet position, but to date neither he nor his successor has ever done so.

4.3. Living donors

A third solution to the scarcity problem is the gradual extension of the system of living donors. This also entails changing established morals. When the law on organ transplants was adopted, rules for living donation were very strict. From the 1970s to the mid-1990s, living donors were used only as a last resort. The general opinion was that living donation should be approached with great care, because of the danger of a patient or other family members putting pressure on a potential donor. It was agreed that living donation was ethically acceptable only if the donor was a close relative. Anonymous donation was rejected for fear that it would eventually lead to commercial donation, and because an offer to donate an organ to a complete stranger could be the symptom of a psychological disorder.

However, these moral considerations gradually loosened between 1996 and 2006. First the inclusion of partners enlarged the circle of possible donors. Then, in 2003 the Health Council changed its previous position on this subject by arguing that people in fact have a *right* to make the offer to be a living organ donor. The Minister of Health went even further, saying that not only can a person donate an organ to the dead donor pool, he also has the right to 'directed donation' (something the Health Council still finds unacceptable); he can, for example, decide he wants to give his organ to a famous person in need of a kidney transplant [55]. Today, personal ties are no longer deemed necessary. The first living organ donation from an anonymous donor in the Netherlands was performed in 2000 [56], and in 2004 a so-called cross-over program was officially started [57].

Unfortunately, this new regime did little to solve the organ shortage.

4.4. Organ trade

Until 2007 commercial donation was a taboo according to the various participants in the Dutch debate. The general view was that organ donation should be an act of altruism. In the Netherlands, payment of donors, in whatever form, was denounced categorically.⁸ Article 2 of the Organ Donation Act forbids payment for organs.

⁶ Two additional criteria are time on the waiting list, and Eurotransplant's Acceptable Mismatch program. This program gives difficult-to-match patients the possibility of getting a new organ despite the fact that another, more compatible patient, is more likely to have a successful transplantation [53].

⁷ Such a system would also be against European law, according to Buijsen [54].

⁸ Why payment for organs is opposed so strongly in the Netherlands is not quite clear. Payment for participation in medical experiments, which is comparable to organ donation considering the fact that healthy (and sick) people are asked to take some risk for the benefit of others, is allowed.

Recently, however, this taboo seems to be cracking. First, it was discovered that the prohibitive clause only applies when the crime is committed in the Netherlands. Hence patients may go to China or India to purchase a kidney, heart, or liver. And people do just that. Stories of people buying a kidney in India from a living donor have been around for some time, with estimates of 60% of all kidney donations in India being paid for [58]. More recently there have been media reports of trade involving the organs of Chinese prisoners on death row [59]. The Dutch kidney patient organization immediately spoke out against these practices [59]. The Minister of Health also disapproved of the commercial donation business, but added that when it occurs outside the Netherlands, it is outside Dutch jurisdiction and nothing can be done [60].

Opening a new debate, A.J. Hoitsma said, “Here in the West, when the need is high, you more easily think of paying a living donor. It’s a scary possibility, and of course you should formulate thorough rules. It may not be ideal, but in my view it is a better option and somewhat less bad than sending people to China to order an organ” [61].

Medical ethicists Gert van Dijk and Medard Hilhorst wrote a report for the Centre for Ethics and Health (a think tank for the two most important advisory councils in Dutch healthcare). In it they discuss the possibility of introducing rewards in the organ transplant regime: a modest reward for people who register as post-mortem donors (a one-time reduction of the health insurance premium); a reward for relatives who grant permission to use the organs of a deceased person (payment for funeral costs, psychological counselling); and a substantial reward for living kidney donors (a waiver of health insurance for the remainder of their lives) [62].

So far, however, these moral ‘experiments’ have failed to resolve the organ shortage, perhaps because the new moral latitude is only discussed but not yet implemented (as in the cases of the reciprocity principle and financial rewards), or because the new moral bypasses do not deliver as many organs as are needed for patients on waiting lists (as in the case of public information and allowing more categories of living donors). Therefore, technological bypasses are being explored simultaneously.

4.5. *Artificial organs*

One of the organizations that throughout the years pleaded most vigorously in favour of the no-objection system, is the Kidney Foundation. When the organ donation system was not changed in 2004, the Kidney Foundation responded by starting a research program regarding better organ replacement machines. The Foundation thinks researchers should try to develop implantable artificial kidneys [63], and others in the transplant field agree. In the words of Johan De Fijter (professor of kidney diseases): “There is an organ shortage and you can grumble about that, but you can also optimise the care you can provide” [62].

4.6. *Xenotransplantation*

The shortage of human organ donors has stimulated research into other technological possibilities. One such possibility is xenotransplantation—transplanting an organ from one species into another species. Of course, this solution immediately invokes moral concerns. But evaluating the possibilities of this technique, the Dutch Health Council concluded that xenotransplantation was ethically acceptable:

When xenotransplantation is clinically applicable, the technique will contribute to ease the suffering of certain groups of patients and can prolong life in many cases. For that reason the commission finds xenotransplantation from the perspective of man acceptable. She also believes that the interests of the patient outweigh the possible inconvenience and infringement of integrity of the animal and that therefore breeding genetically modified animals for the benefit of xenotransplantation is acceptable. [64]

The government agreed that there were no ethical objections serious enough to put a stop to this technique [65], although Parliament saw some dangers. Public opinion is hesitant; 58% have moral qualms and only 23% believe this technique should be pursued [66]. Although there are objections, research into xenotransplantation goes on. The heart valves of pigs are already being used for transplantation purposes, but to date no other applications have been introduced or tested in society.

4.7. *Tissue engineering*

Tissue engineering is another technique that might one day contribute to reducing the organ shortage and organ rejection. The ultimate goal of this technique is to secure bio-implants and other implants to support or replace damaged or poorly functioning organs and tissue, such as skin, cartilage, bone, blood vessels, liver, and kidney [67]. The first-ever bladder has already been grown by scientists in a laboratory and placed into a person [68]. In the Netherlands, this type of research is still in the very early stages. For the foreseeable future, it seems unrealistic that the organ shortage can be substantially reduced using this technique.

So, although much research is going on, as yet there are no technological solutions to the problem of organ scarcity. This implies that in the coming years both moral and technological bypasses will continue to be explored.

5. **Concluding remarks**

Often the cold world of mute things—technology—is contrasted with the warm and vibrant world of meaning and values—morality. Even if both worlds are not presented as deeply antagonistic, they are typically understood to be utterly

different. In our analysis of the prolonged and repetitive Dutch debate on organ donation, we have shown that the two worlds are intimately related. They affect each other and compete by promising alternative solutions to the same problem. There is nothing scary or transgressive about this mutual shaping.

The development of transplantation technology received important support from the optimistic belief that technological progress is an important moral value in itself. Furthermore, as soon as the technological opportunity to help people appeared on the horizon, it created the moral obligation to further pursue this technological trajectory. Ciclosporin enhanced a patient's quality of life after transplantation to such an extent that issues of distributive justice and claim rights came to the fore. From the moment this crucial technological innovation made it possible to help patients, the corresponding moral obligation was quickly established. But this techno-moral obligation raised new moral concerns. We have seen how, through moral path-dependency, existing moral solutions to old problems were 'transported' to help solve the new ones. Other concerns could only be solved by redefining the situation, as in the case of the new 'brain-death' criterion, tailored to facilitate the emerging practice of organ transplantation.

But the main concern was that the new technology created a demand that it could not, and still cannot, satisfy. The scarcity of organs for transplantation is logically dependent on prior technological developments, but this scarcity is co-shaped by moral considerations. On the one hand, it is for moral considerations that society is willing to pay for needed operations, because it thinks patients have a moral right to the necessary treatment, which increases demand considerably. On the other hand, moral considerations keep in place a system of organ donation that exacerbates the scarcity by insisting that donor decisions be voluntary and conscious. The robustness of the consent system deflates the notion that technology always forces its way forward leaving morality no other choice than adaptation to the technologically inevitable. In the case of organ donation, we see how deeply ingrained moral principles, such as helping the suffering and the needy, can propel technology forward while other moral principles, such as bodily integrity and self-determination, can hamper its progress.

The tension between these opposing principles invites both moral and technological experimentation. People turn to other parts of morality and to technology to provide byways that circumvent prohibitions. In the case of the consent principle, barring optimal use of the organ transplant technology, adjacent moral principles (the need for neutral information, the distribution of medical care according to need rather than according to reciprocity, the taboo on financial rewards) were put up for modification and tested for their robustness. It is partly the (lack of) success of such moral experiments that will determine whether actors will further pursue them or abandon them.

Simultaneously, technology was being called upon to develop novel means to alleviate the needs of patients, which—if successful—would allow the consent principle to remain unchanged: artificial organs, xenotransplantation, and tissue engineering. As long as organ scarcity keeps frustrating the attempts to alleviate suffering, we can expect this 'open wound' to generate new bids for moral or technological innovation in the next decades.

The question is not whether to accept this mutual shaping of technology and morality, but how to improve upon what is at this moment largely a spontaneous process. Our hope is that a better understanding of the mechanisms and manifestations of techno-moral change will allow actors at the early stages to analyse the situations they encounter and devise problem-solving strategies, whether they be moral, technological, or any combination of the two. Part of what living in a technological culture means, is that we have to deliberate on how best to calibrate the dynamic forces of technology and morality. That there is room for improvement will be testified by all those who are still waiting for a new organ, or who died while waiting.

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