The 'Robotic Divide' and the Framework of Recognition: Re-Articulating the Question of Fair Access to Robotic Technologies

Alberto Pirni and Federica Lucivero*

I. INTRODUCTION

Robotic technologies offer many opportunities to improve work, healthcare, security and education.¹ Assistive robotics technologies, for example, can provide a good level of autonomy for different types of subjects, such as chronically ill patients, disabled and elderly people. As history shows, opportunities go along with societal challenges: the increasing pervasiveness of robotic technologies in society is likely to raise the question of 'fair access' to these technologies. It is precisely this question that is the focus of this article.

As we have learnt from the example of the internet, once a technology has become pervasive in society and has become 'normal', access to it is seen as an entitlement and its possible deprivation as an infringement of a right.² The actual lack of access to digital technologies is considered to be problematic, because it creates a divide between the haves and the have-nots and contributes in this way to creating new or entrenching existing inequalities. This is often referred to as a 'digital divide'. The research question of this paper originates from an attempt to draw a possible parallelism between the digital technologies and the robotic ones. In other words: Can we talk about a 'robotic divide' by

* Alberto Pirni is Assistant Professor in Political Philosophy at the Institute of Law, Politics and Sustainability, Scuola Superiore Sant'Anna—Pisa (Italy); Federica Lucivero is a PostDoc Fellow at the Tilburg Institute for Law, Technology, and Society (TILT), Tilburg University (The Netherlands). While Alberto Pirni is the author of sections II–IV, and Federica Lucivero of sections V–VII, both collaborated in constructing and concluding the essay in its entirety. The research leading to this paper received funding from the European Union Seventh Framework Programme (FP7/2007–2013) under grant agreement no 289092 (RoboLaw).

¹ As a first approximation, we define robotic technologies as complex mechatronic systems that have a physical capacity to interact with human beings and their environments.

² Robin Mansell, 'Digital Opportunities and the Missing Link for Developing Countries' (2001) 17(2) *Oxford Review of Economic Policy* 282.

analogy with the digital one? Are there intrinsic characteristics of robotics technologies that circumscribe a somehow new area of questioning for both political and legal theory?

At first glance, we can talk of 'robotic divide' as an unequal redistribution of resources. Some people can be enhanced and better off because they have access to robots and enhancement technologies while other people are worse off. This divide can appear at the *societal* level among members of a certain society or at the *global* level among different societies/states, as in the case of the developed North and underdeveloped South. This is the old question of social justice applied to new technologies.

These issues are often raised within a monetary and economic normative framework focusing on the importance of guaranteeing less well-off people opportunities equal to those that richer people have to improve their lives and participate in social and political life on an equal footing. In this contribution, we propose to shift the conceptual and normative frame that is used in political and ethical debate concerning the 'digital/robotic' divide from a matter of 'redistribution of resources' to a matter of 'recognition of differences'. In other words, we suggest the need to go beyond a mere redistributive way of framing the question about fair access to robotic technologies, by stressing the point of view of 'recognition' and of the correlative offering of the 'resources' of social integration that such a point of view intrinsically implies.

The article consists of two parts: in the first part (sections II–IV) we delineate the problem of a 'robotic divide', introduce the concept of recognition as an important complement of redistributive approaches and conceptually articulate this notion; in the second part (sections V–VII) we apply the concept of recognition to deal with specific issues of fair access.

More specifically, in section II, we recall the terms of the so-called 'digital divide' debate and we introduce by analogy the problem of a 'robotic divide'. As we will show, the 'robotic divide' opens up both economic and social problems. We suggest that a promising approach to the 'divide' problem may come from the political-philosophical debate related to the concepts of redistribution and recognition (section III). We argue that a focus on the concept of 'recognition' offers a different but not divergent normative framework to address the current challenges of the robotic divide. In section IV, we propose a reframing of the concept of recognition by structuring it along three principal axes related to the 'recognition of the other': namely, the *identification*, the *acceptation* and the *approval* of the other. Section V provides a transition between the two parts and introduces the question of fair access to assistive technologies suggesting that the concept of recognition can help in addressing this issue but needs to be further articulated. Therefore, we rephrase the abstract axes of recognition in terms of two approaches that have directly addressed the role of new technology in a just society—namely the World Health Organization's International Classification of Functioning Disability and Health (section VI) and Amartya Sen and Martha Nussbaum's Capability Approach (section VII). Finally, an attempt to synthesise the undertaken path and to present an evaluation of the various approaches is offered in section VIII.

II. FROM THE 'DIGITAL DIVIDE' TO THE 'ROBOTIC DIVIDE'

The 'Digital Divide' as a Point of Reference

As far as we can see in the context of contemporary societies, it is a matter of fact that we are completely immersed in a reality that contemplates an ever more evident presence of robots. We have to learn how to deal with a social environment increasingly 'inhabited' by machines that are able to be programmed to solve (or to help man in solving) specific and progressively complex tasks. The claim that this complex reality constitutes a problem—which needs to be better understood in its dimension, thus regulated by law—is made evident by a wide awareness, both at the level of everyday perception and at the level of scientific research.³

In the present context we would like to evoke and to sketch out the issue opened up by the fast development of robotic technologies *by analogy* with one of the best known forms of 'divide'—or of inequality and disparity—related to the developments of another kind of technology, namely the so-called 'digital divide'.

According to a commonly shared basic definition, the term 'digital divide' refers to the disparity in knowledge, acquisition and use of Information and Communication Technologies (ICTs). Large variables of this phenomenon, which are internal to single states for reasons related to geo-morphological characteristics of the territory or economic and education status of potential users, constitute specific objects of much research in this field. Furthermore, a wider range of research has developed refined analyses about internal variables to these indicators at the global level, thus largely replicating the map of development and underdevelopment in the world.⁴

Among other studies, in 2004 the research promoted by the Economic Growth Center of Yale University⁵ was particularly explicit in depicting a very complex situation at the global level, and at the same time in showing a possible line of what public actors at all levels should do, in order to grasp the very point of inequality that ICTs imply. The purpose of this study was to isolate causes and to counterbalance effects of a now evident 'global digital divide'. Following the authors, the way to achieve such a pur-

³ With regard to the scientific results concerning this topic, various research projects funded by the European Union deserve mention: EPOCH (*Ethics in Public Policy Making: The Case of Human Enhancement*, <http://epochproject.com>); EGAIS (*Ethics and Governance in Emerging Technologies*, www.egais-project.eu); ROBOLAW (*Regulating Emerging Robotic Technologies in Europe: Robotics facing Law and Ethics*, www.robolaw.eu); ROBOT-ERA (*Implementation and Integration of Advanced Robotic Systems and Intelligent Environments in Real Scenarios for the Ageing Population*, www.robot-era.eu).

⁴ It should also be remembered that a relevant (direct or indirect) input for this entire area of studies originated within the framework of the United Nations Development Program: www.undp.org/content/undp/en/home.html (accessed 26 July 2013).

⁵ Menzie D Chinn and Robert W Fairlie, 'The Determinants of the Global Digital Divide: A Cross-Country Analysis of Computer and Internet Penetration' (Economic Growth Center of the Yale University Center—Discussion Paper No 881, March 2004), www.econ.yale.edu/growth_pdf/cdp881.pdf (accessed 26 July 2013).

pose passes through the articulation of a precise list of indicators that have to be taken into consideration: from economic variables ('income per capita, years of schooling, illiteracy, trade openness'), to demographic ones ('youth and aged dependency ratios, urbanisation rate'), from infrastructure indicators (telephone density, electricity consumption), to 'telecommunications pricing measures, and regulatory quality'. The result is an extremely articulated framework that surrounds a reality which is enormously differentiated and constantly changing.⁶

However, far from having solved this issue—as demonstrated by the most recent developments in the debate⁷—technological innovation places new issues on public actors' agendas. In line with the issues raised by ICT technologies, robotic technologies also raise questions of fair access. As we subsequently explain, while remaining within the larger frame problem of the digital divide, there is room to define a 'divide' specifically related to robotic technologies. We would like to provisionally designate it as the 'robotic divide'.⁸

Mapping the Field of Robotics

In order to isolate a *robotic divide*, we should first clarify the common usage and meaning for the term 'robot' and the adjective 'robotic'. On initial consideration, it is customary in the field of robotics to distinguish between *industrial* and *service* robots. The first group comprises a large number of robots, which have been designed for manufacturing applications and to be operated in isolation from humans. Despite its extremely wide variety, a taxonomy of this type of robots has become a matter of common usage due to the presence of a number of international standards.⁹

6 An interactive country-by-country map (updated at February 2012) showing the percentage of the world population with reliable internet access is available at www.calvin.edu/~svleest/digitalDivide.html. This map, which uses data taken from the 'Internet World Stats' (www.internetworldstats.com/stats.htm, accessed 26 July 2013), is a very rich source of information on the topic.

7 Among recent research see Sushil K Sharma (ed), *E-Adoption and Technologies for Empowering Developing Countries: Global Advancements* (Information Science Reference, 2012); Jeffrey James, *Digital Interactions in Developing Countries: An Economic Perspective* (Routledge, 2013); Massimo Ragnedda and Glenn W Muschert (eds), *The Digital Divide: The Internet and Social Inequality in International Perspective* (Routledge, 2013); Vishanth Weerakkody and Christopher G Reddick (eds), *Public Sector Transformation through E-Government: Experiences from Europe and North America* (Routledge, 2013).

8 One of the authors has begun to develop some preliminary frameworks relating to such a 'robotic divide': see Alberto Pirni, 'Immaginari sociali in trasformazione: per una fenomenologia della corporeità nell'epoca dello human enhancement' [Social Imaginaries in Transformation: Towards a Phenomenology of Corporeity in the Age of Human Enhancement] in Giacomo Pezzano and Davide Sisto (eds), *Immagini, immaginari e politica* (ETS, 2013) 133; Alberto Pirni, 'Corpo e mondo: intorno all'idea di soggetto possibile nella contemporaneità tecnologica' [Body and World: About the Idea of Subject for Technological Contemporaneity] in Carla Danani, Benedetta Giovanola, Maria L Perri and Daniela Verducci (eds), *L'essere che è, l'essere che accade: percorsi teoretici in filosofia morale* (Vita e Pensiero, 2013) 227.

9 Among others, we mention here the more relevant ones with respect to definition-related profiles: ISO/TR 13309:1995, *Manipulating industrial robots—Informative guide on test equipment and metrology methods of operation for robot performance evaluation in accordance with ISO 9283*; ISO 11593:1996, *Manipulating industrial robots—Automatic end effector exchange systems—Vocabulary/presentation of characteristics*; ISO

A definition of 'service robots' appears more complex. In an initial assessment, we could say that this type of robots conceptually presupposes forms of human-robot interactions, along a scale of different intensity. A clear-cut definition of service robots is however difficult, as is evidenced by the fact that the first 'non-industrial robot safety standard' was planned for August 2013 (while we can mention more than 10 existing standards related to industrial robots).

Service robots 'for professional uses' (such as medical robots, defence applications, or co-workers, such as milking robots or the recently presented 'lettuce bot'¹⁰) can be distinguished from service robots 'for personal and private use', which comprise domestic (household) robots (such as vacuum and floor cleaning, robotic lawn mowers), entertainment and leisure robots (toy robots, child care robots, educational robots and so on).

Under the same category of service robots for personal and private use, we could perhaps isolate a further sub-category related to the large field of 'assistive robotics' for elderly, disabled or impaired persons. The entire wide family of 'service robots' is characterised by an increasing level of human-robot interaction and a corresponding need to be pre-formed according to the preferences and requirements of the individual users. In other words, what differentiates such a family, besides the human-robot interaction, is that these robots have to be tailored to the characteristics and preferences of the individual user.¹¹

The importance of human-robot interaction and the centrality of preferences and differences among users is particularly relevant in the case of assistive robotics. This category includes three different types of robots. The first one concerns 'domotics', namely robotic devices (or mechatronic equipment) which are installed in the house and used to assist or facilitate the domestic life of (elderly or impaired) individuals or families. The second one is what we can call 'wearable robots', namely robotic or mechatronic devices that can be put on by individual (again elderly or impaired) subjects to allow or facilitate fundamental tasks or movements, like walking or grasping. Compared with the previous one, the specific difference of this further type is the direct contact or symbiosis with the individual's body that we can recognise in this case for the first time. Finally, the third type consists of 'implanted robots': robotic devices that are stably implanted into the individual's body, such as the cochlear implant or the robotic hand, just to mention

9787:1999, *Manipulating industrial robots—Coordinate systems and motion nomenclatures*; ISO 9946:1999, *Manipulating industrial robots—Presentation of characteristics*. For an in-depth-discussion of such a distinction see Gurvinder S Virk, 'The Role of Standardisation in the Regulation of Robotic Technologies' in Erica Palmerini and Elettra Stradella (eds), *Law and Technology. The Challenge of Regulating Technological Development* (Pisa University Press, 2013) 311.

10 For preliminary information about this see <http://agreport365.com/lettuce-bot-could-be-the-future-of-agriculture> (posted 19 July 2013); for one of the first comments made about the socio-economic consequences of a possible mass introduction of such a robot see <http://globaleconomicanalysis.blogspot.it/2013/07/farm-robots-to-make-migrant-worker.html> (posted 27 July 2013). Both sites accessed 20 August 2013.

11 Christopher Harper and Gurvinder S Virk, 'Toward the Development of International Safety Standards for Human Robot Interaction' (2010) 2 *International Journal of Social Robotics* 229.

two of the best known examples. Also, between these last two types we can appreciate an intuitive specific difference. Even if both types presuppose contact with an individual's body, 'wearable robots' always remain external and separable from the users, while the last type presupposes an external as well as internal connection with the body that is stable, not infrequently irreversible, but in each case produced by a surgical operation.

Which Divide?

The result of this preliminary and limited map of robotics offers the image of a vast territory, with surely disputable boundaries that are constantly growing. Now, coming back to our starting point, we should assume that, if a 'robotic divide' does exist, it has to be made clear with respect to all types of robots currently available, namely, from industrial robots up to 'implanted' ones.

In an initial evaluation, it could sound pretty obvious to affirm that all categories of robots produce a 'divide' for primarily economic reasons, not unlike in the case of the digital divide. These are technologies that are not available to all, because of the considerable economic investment that is required for research as well as for purchase, maintenance and updating. The availability, as well as the possibilities of acquisition and use, of such technologies could be measured country by country along the same (or a similar) list of indicators that is used in research on the digital divide.

Another point of analogy with the more famous divide might be highlighted with respect to the level of research funding that each self-styled 'modern' country is investing in robotics—this broad field of research being believed to be strategic not only for economic development but also for the improvement of the quality of life. In the case of the robotic divide, the same indicators used in connection with the digital divide—such as the sophistication of infrastructures, educational and cultural levels, and the demographic variables of a country¹²—can be applied to measure the level of usage of particular kinds of robotic technologies in a potentially endless number of tasks.

But the analogy between the reasons that sustain both the digital divide and the robotic one ends here. More explicitly, besides economic or knowledge motivations, each robotic type implies a specific way of developing a divide. And each one of these developments still has to be articulated, understood and, subsequently, accompanied by specific public policies to counterbalance and, possibly, reduce it.

A first range of public policies to counterbalance and possibly reduce the robotic divide might be associated with the need for redistribution which, in the name of the public interest, seek to counterbalance evident inequalities at both national and international levels through specific public policies. But redistributive politics presuppose the capacity of the public actor to isolate a sort of basic level of goods that, for example, have to be guaranteed to all citizens of a state. Does something analogous exist in the case of

¹² See nn 4 and 5.

robotic technologies? By analogy with the guaranteed minimum income, should we aim for a sort of 'guaranteed minimum list of robotic technologies' for all citizens? In the case of service robots, it makes little sense to think of an undifferentiated allocation by the state of a set of such robotic technologies, almost as if it were a sort of 'minimum robotic wage' or of 'comfort robotic items'. Above all, it would make little sense if this allocation were mandatory and, at the same time, undifferentiated. This clearly appears in the case of complex service robots, which involve a deeper and completely individual interrelation between the robot and its user.

Nonetheless, here the problem would deserve further analysis. In fact, what could be considered appropriate is not so much to assign specifically, but to provide, through national health systems, the faculty to access specific funding for the use of robotic technologies in cases where these might make possible, for example, the sole and effective way to recover a fundamental ability of the human person, which borders on the protection of a fundamental right.¹³

Furthermore, 'service robots' are designed to support close interaction with humans, also by contemplating anthropomorphic forms, and in assuming the profiles of an authentic symbiosis. Here, the specific difference of concept and design of each technology becomes more and more relevant from the point of view of the individual user. In fact, these machines interact with the very personal sphere of the individual, and a personal relationship forms between robotic device and user. Solely referring to the economic sphere or to schooling or to social-demographic indicators—in short, the indicators elaborated to address the problem of the digital divide—does not acknowledge this sphere of interaction between user and robot.¹⁴

These observations imply that we can talk of a robotic divide in terms different to those of a more general digital divide. But this claim, in its turn, has further consequences. First of all, the point of view of *redistribution*, which is typical of 'welfare state policies' and often appealed to in connection with the political issue of bridging the digital gap, seems to lead to another point of view, one related to the concept of *recognition*, which is different but in itself not alternative to the first. Going more in depth with this twofold conceptual approach is the topic of the following section, since linking it to an influential debate within the social sciences can contribute to further developing a map of the 'robotic divide'.

¹³ This is a crucial point that certainly requires specific analysis, and we propose to deal with it elsewhere. However, a preliminary hint, related to the capability approach, is articulated here, in sections VI–VIII.

¹⁴ We are aware of research that has shown how internet interfaces and digital environments have a critical role in influencing the cognitive processes of their users: see Lucy A Suchman, *Plans and Situated Actions: The Problem of Human-Machine Communication* (Cambridge University Press, 1987). Nonetheless, as we try subsequently to extensively explain, we sustain that robotic technologies inaugurate new and specific forms of interaction between man and machine.

III. DEVELOPING INTERPRETIVE TOOLS FOR THE 'ROBOTIC DIVIDE': REDISTRIBUTION AND/OR RECOGNITION?

In the first years of the twenty-first century, two prominent scholars in the field of social sciences and political philosophy, Nancy Fraser and Axel Honneth, engaged in an interesting dialogue about the definition of the most burning issues of contemporary multicultural societies.¹⁵

The starting point of that dialogue was a shared interpretation of a theory of justice which would be adequate to the contemporary challenges: this theory should include at least two sets of concerns: those cast in the Fordist era as 'struggles over distribution' on the one hand, and those cast today as 'struggles for recognition' on the other. It is Nancy Fraser who has placed both sets in a transparent and particularly clear contraposition, and who deserves to be cited here. In her terms, the first struggles are those related to

redistributive claims, which seek a more just distribution of resources and wealth. Examples include claims for redistribution from the North to the South, from the rich to the poor, and ... from the owners ... egalitarian redistributive justice have supplied the paradigm case for most theorizing about social justice for the past 150 years.¹⁶

While remaining within the frame of social justice claims, in more recent times the attention of political theorists has been captured by another set of issues—namely, issues that characterise contemporary multicultural societies and the urgent challenges of living together among culturally different individuals and groups. She calls these latter issues internal claims to the politics of recognition.

Here the goal, in its most plausible form, is a difference-friendly world, where assimilation to majority or dominant cultural norms is no longer the price of equal respect. Examples include claims for the recognition of the distinctive perspectives of ethnic or sexual minorities, as well as of gender difference.¹⁷

However, the shared horizon of both authors ends up at the point of sketching the problematic profile. From his point of view, Honneth argues that recognition is an 'over-arching moral category' from which the politics of redistribution might be derived. In this perspective, the socialist ideal of redistribution is a sort of derivative product or a sub-variety of the struggle for recognition. In her turn, Fraser denies that redistribution can be subsumed under the category of recognition. Elaborating her position in terms of the 'anatomy of a false antithesis', she proposes a sort of dualistic perspective that tends to determine both categories as co-fundamental and mutually irreducible dimensions of justice—and of *social* justice more specifically. Let us follow the way of putting the argument inaugurated by Fraser.

¹⁵ Nancy Fraser and Axel Honneth, *Redistribution or Recognition? A Political Philosophical Exchange* (Verso, 2003).

¹⁶ *Ibid.*, 7.

¹⁷ *Ibid.*

She intends to show the co-fundamentality of both categories by taking into account (at least) two different ways of defining and structuring the same field, namely the different conceptions of injustice that the two paradigms assume. On the one hand, the redistribution paradigm focuses on injustices that it defines as 'socio-economic'. Examples of such injustices are exploitation, economic marginalisation and deprivation. On the other hand, the paradigm of recognition takes into account forms of injustice that are defined as 'cultural'. Some examples are cultural domination, non-recognition and disrespect.

While the previous form of injustice, which is related to the distribution paradigm, would be rooted in the economic structure of society, the latter one (linked to the recognition paradigm) would be grounded in social patterns of representation, interpretation and communication. Very subtle forms of injustice originate from the latter; they are forms which border on social indifference, or, even worse, on a deliberate attempt at marginalising groups as well as individuals who are not recognised as adequate members of the same community. Think about a person who is a carrier of a service robotic technology and who, for this reason, risks being not recognised or marginalised.¹⁸

Against these two forms of injustice, both paradigms have proposed different sorts of remedies. While in the redistribution paradigm the main remedy passes through an economic restructuring of various sorts, in the recognition paradigm the remedy for injustice is represented by a cultural or symbolic change. This could involve an increased respect for potentially marginalised (individual or group) identities or a renewed and positively heightened valuation of cultural diversity. Furthermore—and this becomes more interesting within our thematic frame—such a cultural *and* symbolic change can involve an overall transformation of societal patterns of representation, interpretation and communication 'in ways that would change everyone's social identity'. And it is precisely this type of change that we should encourage in order to launch a proper overcoming that seems to assume the profile of a social divide, or of an exclusion in place of a social integration that would be legitimately held instead.

This 'two-dimensional conception of justice' is particularly fruitful within our discourse. The point of distinction (and of necessary integration) may be practically presented in this way: Should we (as public actors) guarantee available economic resources, in order to redistribute wealth and to counterbalance economic differences which are evidently present in our societies, or do we have to offer social and symbolic (that is: not just economic) resources of recognition, in order to provide concrete possibilities of interaction and integration for the largest possible part of our population?

Now, if we return to our starting point, we must concede that, against the need to avoid what we can call a 'robotic divide', both dimensions should be taken into account,

¹⁸ For example, we can think of working tasks, such as public relations or customer services, from which that person may have been excluded, motivated by not being able (any longer) to get the best and most effective results because of his disability or aesthetic appearance. Analogous examples of (more or less) subtle exclusion could be noted beyond the working sphere.

even if an order or priority between them should be established. In recalling such a debate, we have achieved a sort of strengthening of the position we tried to present in the previous section, namely the fact that the concept of recognition seems to imply profiles and meanings that appear more adequate to grasp the level of complexity conceptually linked to the specific divide of the service robots, namely to technologies that are highly interactive with human beings.

Subsequently, we would like to go further in this direction. By developing a greater understanding of the concept of recognition, we are going to articulate an intermediate position, which is comprehensive of both a 'redistribution' and a 'recognition' dimension in addressing questions of equal access to robotic technologies. In fact, we aim to sketch out an approach to address questions of recognition which also incorporate the need for redistribution, by reconsidering the argumentative lines that we have so far tried to set up.

IV. DOMAINS OF RECOGNITION

Such a co-fundamentality of the two dimensions could thus be subsumed under the perspective of *recognition*. Let us try to make sense of this affirmation in order to appreciate more accurately what meaning of the concept of recognition we are dealing with and to prepare the field for a more explicit comparison with applicative contexts related to service (specifically: assistive) robotic technologies.

Following the main assumption of another contemporary scholar in political and social philosophy, Charles Taylor, we can affirm that recognition is one of the fundamental values for humans, which has climbed the list of priorities in political and juridical domains in recent times, particularly in relation to the debate around multiculturalism. However, beyond this debate, Taylor familiarises us with a fundamental theoretical thesis of general validity:

The thesis is that our identity is partly shaped by recognition or its absence, often by the *misrecognition* of others, and so a person or group of people can suffer real damage, real distortion, if the people or society around them mirror back to them a confining or demeaning or contemptible picture of themselves. Nonrecognition or misrecognition can inflict harm, can be a form of oppression, imprisoning someone in a false, distorted, and reduced mode of being.¹⁹

Therefore, the key concept of recognition enables us to draw out and analyse several potentially problematic aspects of what could be addressed in terms of 'redistribution', though not only—and not simply—of resources, but also of social acceptance of our-

¹⁹ Charles Taylor, 'The Politics of Recognition' in A Gutmann (ed), *Multiculturalism: Examining the Politics of Recognition* (Princeton University Press, 1994) 25. For a wide discussion of Taylor's perspective, see Barbara Henry and Alberto Pirni, *La via identitaria al multiculturalismo: Charles Taylor e oltre* (Rubbettino, 2006).

selves, both at the individual and collective level. The concept of recognition thus allows us to redeem the complementarity we were talking about above. But in order to grasp more sharply what is at stake, we have to first understand what the reference to the concept of recognition implies in itself.²⁰

We must first draw a distinction between two semantic-conceptual spheres that the issue of recognition includes. When we speak about recognition we are generally referring to the recognition of the self (or self-recognition) as well as the recognition of the other. In the present context, we would like to refer only to the sphere of the recognition of others. Since we are trying to develop a differentiated conceptual vocabulary which should be related to the public policy concern, we have to deal firstly with possible problematic interactions among different social subjects. Among these subjects, namely in a pluralistic and intersubjective context of interaction, what is crucial is the recognition of each subject by any other subject who is involved in the same practice of social interaction. The quest for recognition emerges precisely in that 'place', and it is exactly there that such a quest should find languages and vocabularies in order to be positively answered.

The recognition of the other can be conceptually depicted along *three* progressive levels of complexification of the same object. The *first level* may be summed up in the form of a question, and the question could be formulated about the issue of the *identification of the other*. With this expression we mean to allude to the logical-epistemological level, namely, by simply recalling here the *principium identificationis* is typical of the Medieval Thomistic School, which concerns the 'knowledge' of that specific 'other' we have in front of us. In other words, this is the level of *ascertainment*, or of *detecting* who we are dealing with.

At this level we seek answers to questions such as 'Who is that person?', ie questions which concern the identification of the other that is 'making contact' with us, namely that is entering into our experiential field. Still, within this first level, it is possible to recognise a further series of questions, which deal with formulations like 'who is that person who is going to ...?'. In other words, besides questions regarding the 'cognitive dimension' being properly understood, we should also consider questions concerning the 'practical dimension', which relates to the confirmation of the identity of that particular agent at the moment at which he is performing that specific action.

Within the recognition of the other's dimension, it is thus possible to distinguish a *second level*: the level of the *acceptation of the other*. A first normative profile is clearly coextensive to this level. On the one—and descriptive—side, the 'acceptation of the other' level regards its being a part of our everyday life (starting from clear phenomeno-

²⁰ Subsequently, we will sketch out a theoretical and explanatory attempt based on Alberto Pirni, 'Cosa riconosce il riconoscimento? Il difficile guado tra teoria e prassi politica' [What does Recognition Recognize? The Difficult of Navigating between Theory and Political Praxis] in Antonio Carnevale and Irene Strazzeri (eds), *Lotte, riconoscimento, diritti* (Morlacchi, 2011) 219; Alberto Pirni, 'Vom Umgekehrten ausgehen: Alterität, Anerkennung und Freiheit' [Proceeding in Reverse: Otherness, Recognition, and Freedom] in Barbara Henry and Alberto Pirni (eds), *Der asymmetrische Westen: Zur Pragmatik der Koexistenz pluralistischer Gesellschaften* (Transcript, 2012) 187.

logical evidence: the other subject exists and lives beside us). On the other side—and here is the normative aspect—this ‘accepting’ also refers simultaneously to the diverse (and often ambiguous) inclusion of the other in a context of equal respect, or within that ideal ‘community of equals’ that we hope will be more and more clearly stated in our time and at all latitudes.

In this respect, the acceptance of the other level refers *naturaliter* to the conceptual sphere of tolerance. Nonetheless, we must consider that this level clearly inaugurates a form of ‘going beyond’ the more reductive meaning of the Latin word *tolerare*, if we recall that ‘tolerare’ firstly means the bearing of a *pondus*: along the rationale implied by this level, ‘dealing with the other’ can no longer be considered as a *pondus*, a weight which is received—and in any case not chosen—as a sort of problem that has to be endured and experienced as inevitable.

Obviously, the distinction between the two levels and domains of *identification/ascertainment* and *acceptation* of the other presented here appears evident (and could be sustained) only from an analytical point of view, since the constant and constitutive intersection between the logical-epistemological level and the normative one is present at almost every moment of our concrete agency as embodied individuals, namely as individuals placed in a context that is reflexively surmountable but pragmatically determined and fixed. However, it is precisely such an intersection that opens up and problematically makes possible a *third level*, which could be determined by the expression of *approving of the other*.

With this expression we are referring to a level that springs from the expertise of *logical identification of the other*, but which, at the same time, entails the normative claim linked to the *acceptance of the other* which is typical of the second level, in fact by seeking to interpret it extensively, namely by presenting it on the public dimension. It is a matter not ‘only’ of accepting and including the other in our interpersonal and daily relationships (first level), but also (second level) of recognising as *prima facie* valid any value claim that comes from her/him (understood both as an individual and a group) and, consequently, along a scale of increasing impact on public policy and decision-making, it is a matter of recognising as politically legitimate any relevant application for allocation of resources (third level)—but if and only if that claim does not contradict the laws in force.

In these terms, the articulation of another normative level has been carried out. Such a level enriches the (albeit minimal) framework of the hitherto outlined recognition of the other with a further degree of complexity and, at the same time, with an explicit expectation of effectiveness. The level of ‘approving the other’ suggests a deep reconsideration of the question about the ‘who’ that is waiting to be recognised. This means first identifying, then accepting, and finally recognising the political subject, at the individual as well as the group level.²¹

21 This appears to be particularly problematic within the context of elaboration and adoption of public policies devoted to so-called ‘multicultural societies’.

But the recurrence of the question of ‘who’ does not exhaust the complexity of this additional normative level: an additional question related to ‘what’ should be recognised has to be added to the first one. And this question bifurcates further, by including two other ones. The first (further) question is about what should be recognised of these subjects, or which values and cultural particularities—and consequent practices—should be acknowledged as legitimate, namely, as not conflicting with the sphere of the already existing rights in the specific place we are sharing. The second one, consequently, is about what should be recognised to them, ie which (new) rights can be concretely admitted and should be granted to—and for—a group that presents itself in a culturally specific way and in forms that imply the need and/or the will to remain here.

Finally, a last question or group of issues is related to ‘how’ to recognise the subject that we have preliminarily identified and accepted. In other words, we have to understand what choices or policy practices—ie what negative and positive (public) actions—should be undertaken in order to concretely recognise this subject within a structured legal frame.

In this last normative level (in its turn consisting of three areas of concerns related to the who / what / how questions), the aforementioned unavoidable question of redistribution may perhaps be considered under a new light, since it is now completely subsumed within the perspective of recognition. In fact, when we assume the point of view of recognition, specifically along its third level, we are implicitly acknowledging as legitimate the request for the allocation of funding which is directly linked to the implementation of (new) rights.

The point at stake, from here onwards, relates to how this scenario changes and needs to be integrated if, from the context of the policies related to both welfaristic and multicultural claims, we switch to confront service robotic technologies, and more specifically assistive robotic technologies. The correlative public commitment that the third level of recognition directly implies invites a very cautious acquisition of such a point of view, especially when it is related to requests (implementation of technologies) whose impact could be very relevant for both those who receive such technologies but also for those who may be excluded.

V. EQUAL ACCESS, FUNCTIONING AND CAPABILITIES

The considerations sketched so far offer an attempt to frame the question of how to guarantee fair access to robotic technologies. By highlighting the importance of rearticulating our understanding of equal access to emerging technologies along the concept of ‘recognition’, we pointed out that regulatory and policy decisions on how to guarantee equal access to these technologies should not only be focused on economic criteria. Rather they should also take into account and acknowledge cultural and symbolic differences, which have to be valued through the lens of sensibility and awareness of the

specific contexts. In articulating the concept of 'recognition' that underlies this idea, we started by pointing out the meaning of the framework of recognition within a theory of justice. In so doing, three dimensions of the process of recognition have been articulated, namely the *identification*, *acceptance* and *approval* of the other's identity. We argue that this conceptual framework helps in shifting the current debate on equal access to robotic technologies into a more appropriate normative framework. However, in moving from the conceptual level to more contextual questions concerning the governance of robotic technologies, many questions arise. What does it mean to say that it is important to *identify*, *accept* and *approve* the other in the context of equal access to robotic technologies?

In order to address this question, in the following sections we narrow the focus of our analysis to an area of robotic technologies that is particularly relevant in the context of equal access, namely assistive robotics.²² Assistive robotics is a broadly defined area which includes a diverse set of devices that improve the independence and quality of life of people with disabilities. These devices range from robotic feeders to smart-powered wheelchairs, exoskeletons for rehabilitation, smart prosthetics and robot companions.²³ Although these technologies are very diverse, they all clearly raise specific issues of equal access. How do we avoid inequalities, namely 'divides', between people who have access to them and people who do not?

The relevance of this question for policy-making and governance of new technologies emerged in an opinion of the European Group on Ethics in Science and New Technology (EGE) to the European Commission concerning the ethical implications and the consequent policy positions regarding Information and Communication Technologies (ICT) implanted in the human body. This document (dated 2005) repeatedly refers to 'health', 'restoration', 'normality' and 'therapy' as criteria to regulate equal use of and access to these technologies.²⁴ According to the EGE, these technologies should be available for health purposes and distributed on the basis of health needs if they contribute to a restoration of normal functions and an improvement to quality of life.

There should be fair access to ICT implants for health purposes. This means that such access should be based on health care needs rather than on economic resources or social position.²⁵

Despite this, the Opinion does not specifically review robotic technologies; it provides a conceptual framework that applies to certain types of robotic technologies, such as prosthetics and assistive devices. In the EGE recommendation, it was pointed out that other criteria rather than economic ones should be taken into account in addressing this ques-

²² See above, section II.

²³ Steven W Brose, Douglas J Weber, Ben A Salatin, Garret G Grindle, Hongwu Wang, Juan J Vazquez and Rory A Cooper, 'The Role of Assistive Robotics in the Lives of Persons with Disability' (2010) 89(6) *American Journal of Physical Medicine & Rehabilitation* 509.

²⁴ European Group on Ethics and New Technologies European Commission, *Opinion on the Ethical Aspects of ICT Implants in the Human Body* (European Commission, 2005).

²⁵ *Ibid.*, 32.

tion. According to this document, in order to address the question of what the criteria to equally distribute robotic technologies in society are, we have to be able to determine when they can be considered to be used for health purposes. This also implies being able to address the question of how these technologies contribute to restoring 'normal functions' in order to use this as a viable criterion to guarantee equal access to these goods.

Referring to health care needs, however, is not a solution for the question of fair access since it opens up other questions related to the notion of need, disability and capability. Indeed, it has been pointed out that the concept of 'normalcy' does not do justice to human differences. The very standard of what is 'normal' is highly unstable.²⁶ Similarly, it can be argued that the boundary between health purposes and non-health (or lifestyle) purposes is very thin. Therefore, although the EGE opinion addresses the question of fair access to ICT by moving the discourse beyond the socio-economic paradigm, the criterion of 'health need' does not seem to offer a concrete solution. In the following sections, we show that some conceptual help in addressing these open questions is offered by the concept of recognition. In so doing, we further articulate this concept through the vocabulary and concepts of other approaches that have more direct connections to the question of new technology in a just society: the World Health Organization's International Classification of Functioning Disability and Health (ICF) and the capability approach.

VI. HUMAN FUNCTIONING AND CONTEXTUAL FACTORS

The ICF, which was adopted by the World Health Assembly in 2001, has the goal of guiding policies to better meet the needs of people with disabilities. This approach is particularly interesting for our analysis because it offers a broader perspective on the identification of the needs of the other. In this sense, it offers an analytical framework to articulate the first phase of the process of recognition as outlined in section IV.

The ICF was developed as a tool for describing the experience of functioning and its restrictions in the context of diseases and health conditions. The overall objective of this classification is to offer a coding system for different health and health-related states. ICF offers a redefinition of the concept of 'human functioning' as 'an umbrella term for body functions, body structures, activities and participation'.²⁷ The anatomical structures and physiological functions (including mental or psychological functions) are not the only relevant aspects in defining functioning and disability. The interaction of humans with their environment and how people execute tasks within an environment are also rel-

²⁶ Caroline Harnacke, 'Discussing Enhancement and Disability Together' in Federica Lucivero and Anton Vedder (eds), *Beyond Therapy v Enhancement? Multidisciplinary Analyses of a Heated Debate* (Pisa University Press, forthcoming).

²⁷ World Health Organization (WHO), *International Classification of Functioning Disability and Health* (WHO Library, 2001) 212.

evant dimensions for human functioning. The ICF distinguishes between 'activity' and 'participation'. Whereas 'activity' is the execution of a task or action by an individual (the emphasis here is on what the individuals do by themselves), 'participation' is the involvement in a life situation (the emphasis here is on what the individual does in a social context).²⁸

Personal or environmental factors have an impact on these components of human functioning. On the ICF understanding, functioning 'denotes the positive aspects of the interaction between an individual (with a health condition) and that individual's contextual factors (environmental and personal factors).'²⁹ Thus, contextual factors play a central role in facilitating or hindering human functioning in terms of the abovementioned categories. Environmental factors refer to 'all aspects of the external or extrinsic world'³⁰ that have an impact on the individual's functioning. They include not only products and technology, but also the physical and architectonical environment, together with services available in the community (healthcare, transportation, social services), cultural and social attitudes and relationships. The interrelation among these aspects influencing human functioning is represented in Figure 1.

'Products and technology' are a type of contextual factors and can be either *general* products, equipment and technologies used by people in daily living, for mobility or transportation, communication, education, employment, culture, recreation, sport and religion, or *assistive* ('any product, instrument, equipment or technology adapted or specifically designed for improving the function of a disabled person'³¹). These products can be either a facilitator or a barrier to human functioning. Whether a technology is evaluated as a barrier or a facilitator depends on the user's perspective: textured paving may be a facilitator for a blind person but a barrier for a wheelchair user. In belonging to the 'products and technology' category, robotic technologies can remove limitations on functioning in specific domains. However, whether they are barriers or facilitators should be evaluated with respect to the user as well as the environmental context.

Therefore, in the ICF classification contextual factors play a pivotal role in defining functioning and disability. The question is not whether an individual has the ability to execute a task or an action in a standardised environment, but whether they can do it in a specific life situation. Take the example of an individual with quadriplegia: this limitation in capacity can preclude performing some job requirements like using a computer with a manual keyboard.

²⁸ If the impact is non-problematic from the perspective of health, the ICF speaks in terms of human 'functioning'; if the impact is in some sense problematic (eg, associated with impairment due to loss of or abnormality in body structure or physiological function, activity limitation or participation restriction), the ICF discusses this in terms of 'disability' (*ibid*, 8).

²⁹ *Ibid*, 212.

³⁰ *Ibid*, 213.

³¹ *Ibid*, 173.

Figure 1: Interactions among the components of ICT³²

If the workplace doesn't have the necessary facilities, for example voice recognition software, the individual cannot perform her job requirements. But the lack of accommodation and enabling technology in the workplace is not the only environmental factor that can preclude individual performance. Work policies may be the hindrance to performing the work activities—for example, if the quota for people with disabilities is insufficient. Or the individual might be capable of performing the required job activities and yet not hired because of the lack of accessibility of the built environment. Finally, the individual might encounter resistance in co-workers' attitudes towards disabled people and experience a limitation in performing in domains of interpersonal interaction with co-workers. A contextual factor, such as the availability of service robotics (for example an exoskeleton for locomotion), can solve an impairment of a body function or structure, but whether it will limit or foster individual activities or participation in social life depends on other contextual factors, such as the architectonical environment (the presence of barriers to locomotion with such a device) or the cultural environment (the stigmatisation of such assistive devices).³³

³² *Ibid*, 18.

³³ Some examples are discussed in Annex 4 'Case examples' (WHO (n 27) 238). The case of a diabetic child is quite relevant in this respect: where the impairment concerns a function (insulin production), there is no limitation of capacity when insulin levels are under control by medication. The performance problem arises if the child attempts to socialise with peers when eating, unless appropriate food (with limited or no sugar) is provided. Therefore, a change in the environment is as relevant as the impairment in limiting performance.

Furthermore, a product may be a barrier in presence or in absence. For example, a wheelchair can be a barrier in presence because of the negative attitude of a community towards disabled people. Similarly, personal care providers and personal assistants can be a barrier in absence when they are unavailable. This is also important to bear in mind in the case of robotic technologies. As general or assistive devices they have a dual role as facilitators/barriers both in absence and presence. The evaluation of their role depends on considerations of the broader context that also involve social attitudes towards the device and its use in certain contexts.

The ICF offers a useful system for classifying body structures and functions, and domains of human activities in which interaction affects human functioning. This classification abandons an anatomical and physiological definition of disability or functioning. Within this framework, a distinction is drawn between structural/functional impairments and limitations of the performance of the individual. In this way, it is pointed out that the environment has an active role in creating or reducing (or cancelling) a disability. What is 'disabled' depends on: some physiological/anatomic variables, the role of assistive devices in compensating some impairments and restoring/promoting capacities and performances of individual activities, the availability of assistive devices, the preparedness of the physical (architectonical) environment to receive them, and the social and cultural acceptance of the device. The focus on contextual factors shows how human capacities can be limited or enhanced in the performance of some activity due to environmental conditions. The role of technologies in general (and robotics in the specific context of this article) is to facilitate human functioning and overcome impairment, but it can also be a barrier in some contexts.

In this environmentally sensitive approach, the question is not whether robotic technologies are used for health purposes, for restoring or enhancing human functions. Instead, it is a matter of gradual differences that emerge from a concrete observation of what robotic technologies do and how they change specific human practices.³⁴ Take the example of robotic technologies such as exoskeletons, which can reduce impairments, but (1) they have to be provided to the individuals in need, (2) they have to be culturally accepted within the social environment and by the individual, and (3) the physical and logistical environment has to be ready to receive them (for example, in the case of architectonical barriers). Guaranteeing fair access to these technologies therefore requires all these aspects that are specific to a certain social and cultural context to be taken into account.

Going back to the vocabulary of recognition, the question of fair access to robotic technologies requires that we 'identify the others' in the complex array of personal and contextual factors that determine their functioning. In other words, in some cases the

restoration of human functioning does not depend on the availability of a robotic technology. Rather attention has to be drawn to the environment (physical or cultural) that can constitute a barrier for the person hoping to participate in life situations. In light of these considerations, recognising the other means identifying their identity in a social and physical context as well as accepting the role of assistive technologies for their functioning.

VII. HUMAN CAPABILITIES AND PERSONAL DELIBERATION

So far, we have claimed that in order to address the question of equal access to emerging technologies, we need to rearticulate the notion of redistribution within the frame of recognition of cultural and symbolic differences. In so doing we have fleshed out three dimensions of the process of recognising the other. Then, we argued that although the idea of access to technology is often defined (eg, in the EGE report) within the frame of priority of access for health purposes, this is not an easy task. Instead, we need to reconsider the concept of human functioning as environment related and technologically supported. The focus on recognition points out the need to address injustice not only in economic terms, but also in cultural terms, and highlights the relevance of the understanding, acceptance and appreciation of the differences that characterise specific (sub)groups and subjects. Such recognition of differences is highlighted in the reconceptualisation of disability and functioning presented in the ICF. According to this reconceptualisation, human functioning is defined not against a fixed idea of normal functioning, but against a context sensitive assessment of how functions, anatomical structures and environment (including assistive devices) contribute to the performance of activities.

But this is not enough. Recognising the other also implies accepting their actions and decisions and approving them. This means shifting the focus towards the sphere of personal deliberation of the life worth being lived and the political acknowledgment of the importance of such a deliberation. This dimension is clarified by looking at the capability approach of Martha Nussbaum and Amartya Sen.³⁵

Driven by the idea that current approaches to measuring and comparing people's well-being standards are too focused on economic resources and measurable goods and neglect other important, less measurable goods that impact people's quality of life, Sen has proposed a 'capability approach' as an alternative. Essentially, the human capability approach champions

³⁴ For an extensive argument concerning the importance of investigating the practice of the use of robotic technologies for healthcare applications in order to assess their ethical implications, see Aimee van Wynsberghe, *Designing Robots with Care* (University of Twente, 2012).

³⁵ Martha Nussbaum, *Women and Human Development: The Capabilities Approach* (Cambridge University Press, 2000); Amartya Sen, 'Human Rights and Capabilities' in Ethan B Kapstein and Joel H Rosenthal (eds), *Ethics and International Relations* (Ashgate, 2009) 127.

people to have the freedoms (capabilities) to lead the kind of lives they want to lead, to do what they want to do and be the person they want to be. Once they effectively have these freedoms, they can choose to act on those freedoms in line with their own ideas of the kind of life they want to live.³⁶

As Nussbaum explains, human capabilities are conceived as 'what people are actually able to do and to be—in a way informed by an intuitive idea of a life that is worthy of the dignity of the human being'.³⁷ In this context *functioning* is different from *capability*. Sen describes human capability as the 'opportunity to achieve valuable combinations of human functionings—what a person is able to do or be'.³⁸ According to Sen the concept of capability allows us to distinguish between the *ability* 'to do things you would value doing' and the *means* or *instruments* or *permissions* to pursue what you would like to do. The concept of capability focuses on *ability* rather than on means or instruments.³⁹ A certain capability can be turned into functioning mode depending on the person's choice. Nussbaum explains that a person who is capable of (has the opportunity for) sexual expression can always choose a life of celibacy. Similarly, a person with the capability to eat and to be nourished can choose to starve for religious reasons. In this sense, Nussbaum explains that 'capability, not functioning, is the appropriate political goal'.⁴⁰ As long as the capabilities are guaranteed, there is no reason to say that if these are not functioning, the person does not have a fully human life.⁴¹

³⁶ Thomas Gries and Wim Naude, 'Entrepreneurship and Human Development: A Capability Approach' (2011) 95 *Journal of Public Economics* 217.

³⁷ Nussbaum (n 35) 5. In her version of the capability approach, Nussbaum proposes a 'philosophical underpinning for an account of basic constitutional principles that should be respected and implemented by the governments of all nations'. To this end, she has developed a list of 'central human capabilities' that address the question 'what is a human being actually able to do and to be?', taking into consideration which human case we are addressing (male, female, child, adult, able-bodied, impaired, elderly), ie what are the opportunities and liberties? Nussbaum takes it that some functions are central in human life (where 'truly human life' is distinguished from animal functioning on the basis of an idea inspired by Marx and Aristotle of the centrality of practical reason and sociability as human characteristics). Nussbaum's list of capabilities includes: life, bodily health, bodily integrity, senses, imagination and thought, emotion, practical reason, affiliation, play, other species, control over one's environment.

³⁸ Sen (n 35) 153.

³⁹ Sen proposes the concept of capability as offering a framework to reconsider questions about social justice, equality and quality of life. However, he is sceptical about Nussbaum's attempt to provide a list of capabilities. Sen (n 35) remarks that the concept of capability is context dependent and that for different practical purposes we may need a different list. It is also dependent on the purposes of the evaluation for which the concept is used. What is in the list should be left to public discussion and reasoning in the process of democratic deliberation.

⁴⁰ Sen (n 35) 87.

⁴¹ '[T]he distinction between achieved functioning and capabilities is between the realized and the effectively possible, in other words, between achievements on the one hand, and freedom or valuable options from which one can choose on the other': Ingrid Robeyns, 'The Capability Approach: A Theoretical Survey' (2005) 6(1) *Journal of Human Development* 94, quoted in Ilse Oosterlaken, 'The Capability Approach: Taking Stock and Looking Ahead' in Ilse Oosterlaken and Jeroen van den Hoven (eds), *The Capability Approach, Technology and Design* (Springer, 2012) 5.

This aspect is clarified if we consider the debate on cochlear implants to restore hearing functionalities in deaf children. Numerous voices rising within and outside the deaf community have defended the right of deaf parents to raise their children in accordance with their distinctive cultural sense of what it is to be a member of the deaf community.⁴² Having the capability to receive technical assistance to limit a physical impairment implies that individuals are free *not* to actualise this capability. A true recognition of this personal deliberation concerning the life one wants to live requires society to approve, from a normative point of view, the sphere of personal deliberation concerning a life project.

As with the ICF,⁴³ the Capability Approach also acknowledges that the 'conversion of goods and services into functioning is influenced by personal, social and environmental conversion factors'.⁴⁴ The acknowledgement of the importance of personal differences in setting political goals concerning human capability is also evident in Sen's notion of 'adaptive preference',⁴⁵ the phenomenon according to which deprived people are happy with what they have in life because they 'tend to come to terms with their deprivation'. The acceptance of this symbolic difference among individuals, however, raises the need for a process of expansion of capabilities within a certain society. While policies should not force people into functioning, they should however seek to expand their range of capabilities. Returning to the example of cochlear implants, this means offering the children of deaf people the possibility of making their own decisions concerning their identity, without having their parents deciding for them.

This is relevant for the question of access to disability and assistive technologies. It is important that states protect capabilities, because it is not enough that adults are merely free to compete in sportive events. If this capability is not available to impaired children who are confined in an environment where prosthetic limbs are not accepted or mocked, they will not have this capability as they grow up because they will not have the possibility to train. It is therefore important to develop an environment in which this opportunity is offered to these children. They can still choose not to train, but the freedom to decide must rest with them. Also in this case, it is the capability and not the functioning that is the appropriate goal.

Sometimes nation states forbid citizens to act in certain ways (or oblige them to act in other ways) that are considered necessary to protect some central capability. This is done, for example, when voting is promoted by incentives or made compulsory to protect the capability of political participation, or when some drugs are banned as illegal

⁴² CBS News, 'The Cochlear Implant Controversy' (4 September 2001); Robert Sparrow, 'Defending Deaf Culture: The Case of Cochlear Implants' (2005) 13 *Journal of Political Philosophy* 135.

⁴³ For an extensive reflection on the role of the capability approach in the disability debate and an explanation of the relation between the capability approach and the ICF, see Sophie Mitra, 'The Capability Approach and Disability' (2006) 16(4) *Journal of Disability Policy Studies* 236.

⁴⁴ See Oosterlaken (n 41).

⁴⁵ Amartya Sen, *Development as Freedom* (Anchor, 1999).

because they are considered to impair the capability of health and life in a permanent way. Similarly, from a capability approach perspective, states should forbid stigmatisation of people with prosthetic devices because this prevents them from enjoying the capability of participating in social life.

It is important to remark that current interpretations of the capability approach in the context of robotic technologies have pointed out that it would be misleading to consider these technologies as simple instruments for the expansion of human capabilities.⁴⁶ According to this perspective, such an instrumental view of technology neglects the lesson learnt from post-phenomenological analysis of human-technology relationships showing how artefacts engage in a complex array of relationships with their users. This means that when looking at how technologies influence human functioning, it is reductive to expect that these technologies will simply influence a single functioning or capability. Instead, technologies can be expected to enter into a complex relationship with several social actors, re-configuring the material and social context in which the human actor operates and perceives the world. For example, robotic technologies—while assisting impaired people—also contribute to changing the boundaries between the concepts of ‘assisting’ and ‘enhancing’ or ‘able’ and ‘disable’ that offer crucial distinctions in the context of redistribution of resources and in the politics of fairness. The relations between capabilities, technologies, practices and values therefore need to be further interpreted.

In conclusion, resonating with the debate on recognition as a dimension of fair societies, the Capability Approach abandons the idea that political decisions should be based on a (re)distribution of economic resources and acknowledges that different people need different things. Furthermore, it refuses to adopt normative criteria based on the amount and quantification of quality of life, and looks at what people can do and how they can participate in social and political life. This approach contributes to articulating the goal of recognising the other. Different from the ICF classification, the Capability Approach addresses the question of human functioning beyond the question of disease, disability and physical performance. Within this perspective practical reasoning, imagination and affiliation play a role in a list of human capabilities together with bodily health and integrity.⁴⁷ The very concept of ‘capability’ introduces some aspects that are not captured by the concepts of ‘functioning’, ‘capacity’ and ‘performance’ as defined in the ICF report. In fact, the notion of capability is closely connected to the idea of personal choice and deliberation. On this account, individuals therefore have the opportunity to choose whether or not they want to put a certain capability to functional use. This approach consequently locates the concept of capability within a political rather than a physical sphere.

⁴⁶ Mark Coeckelbergh, ‘Human Development or Human Enhancement? A Methodological Reflection on Capabilities and the Evaluation of Information Technologies’ (2011) 13(2) *Ethics and Information Technology* 81.

⁴⁷ See Nussbaum (n 35).

By looking at capabilities from this perspective, the political and cultural context thus takes a central position. In this frame, the question of fair access to robots is not asked in terms of resources to be distributed. Instead, this approach opens up questions concerning the extent to which robots promote or demote capabilities, by assisting specific functioning or creating the conditions for some capabilities to be actualised. It also raises the question of the importance of the personal decision (not) to make use of certain technologies that demote or promote some capabilities.

VIII. CONCLUSION

The issue of the ‘digital divide’ is that the availability and use of new technologies create inequalities within a society (or among different societies), between those who have access to these technologies and benefit from them and those who do not have this opportunity. As explained in section II, authors exploring the digital divide have pointed out that lack of access may be due not only to economic inequality but also to other conditions: social, educational cultural or gender-based. On this basis, we have tried to develop by analogy the argumentative territory for what we have called the ‘robotic divide’. At first glance, such a divide surely implies an economic dimension too. In addition, an undoubtedly relevant part of its problematic nature can be grasped through the refined indicators developed to analyse the former divide.

Thus, we have provisionally assumed that the problem of the robotic divide can find a solution along the lines presented by redistributive models, namely welfare politics. Nonetheless, if we specifically consider the wide family of service robots and the individual and exclusive types of interaction between man and machine that each of them inaugurates, the framework of redistribution of (mere economic) resources seems to be insufficient to grasp the point.

In order to explain this issue, we presented a theoretical framework that sets the question of inequality apart from an exclusive focus on the economic sphere. To this end, we outlined a new articulation of the dialectic between the concepts of redistribution and of recognition, by recalling a famous debate within the social sciences. The debate about ‘redistribution or recognition’ that we have thus faced offers a more evident presentation of the necessity of going further with the development of a set of specific conceptual tools for the robotic divide that find their first point of reference in the concept of recognition.

The subsequent need to re-define the overall sphere of recognition, in forms that we wish to be integrative of—and not alternative to—the point of view of redistribution, was driven by the awareness that, in order to understand a wider problematic profile, a more refined conceptual vocabulary is necessary. Following this assumption, we defined three levels of recognition: the *identification*, the *acceptation* and the *approval* of the other.

The goal thus became to apply such levels of recognition to persons who are users or bearers of service robotic technologies. The articulation of the concept of recognition as a threefold process of identification/acceptance/approval of the other helps in making the same vocabulary of recognition understandable from different points of view in the universe of the assistive robotic divide, which is the specific divide we have addressed in this context.

Assuming that this conceptual framework offers new normative and abstract categories whose effectiveness has to be verified, we first confronted the assumptions articulated by the European Group on Ethics in Science and New Technology (EGE). The group addresses the question of fair access to technologies (even if not specifically robotic ones), by moving the discourse beyond the socio-economic paradigm. Nonetheless, the criterion of 'health need' evoked in this context does not seem to offer a concrete solution.

As far as robotic technologies are concerned (and specifically service robotic technologies), a paradoxical issue emerges: on the one hand, service robotics is designed with the goal of restoring physical and functional impairments and matching the divide between disabled individuals and able ones; on the other hand, service robotic technologies are prone to create a divide within a society. In order to assess this issue, we turned to the International Classification of Functioning, Disability and Health (ICF). As discussion of this approach has shown, environment and technologies are crucial contextual factors in human functioning. Recognising the 'other' means remaining sensitive to the cultural, social and architectonical environment wherein an assistive device can act as a barrier or as a facilitator. The simplistic reference to 'health care needs' is insufficient as a criterion for policy decisions: the social, cultural and physical environment play a part in determining the positive role of assistive robotics as much as the physical impairment they aim at restoring. Identifying these specificities is at the base of any policy decision concerning the avoidance of a robotic divide.

Furthermore, recognising cultural and symbolic differences in society also requires that we accept and respect them. This point has been further articulated through the reference to the Capability Approach of Sen and Nussbaum. This approach points out the centrality of personal deliberation in deciding the type of life worth being lived. Whereas this approach highlights states' responsibility to bestow on individuals the capabilities to do things a person will value doing, it also emphasises the personal choice of not actualising these capabilities—so to speak, of not turning these 'capabilities' into 'functionings'. Accepting the right of the individual to refuse to actualise a certain capability (for example, as in the case of deaf people who decide not to hear) is an important step in the process of recognition. Turning to the case of assistive robotic technologies, this means that a true recognition of an individual's right to choose their life project implies creating at the same time the actual possibility for an individual to refuse to use a certain technology.

By remaining within the liberal framework, robotic technologies offer new and still unexplored possibilities that can also be refused by individuals on behalf of their own freedom. At the same time, such possibilities might/should also be limited by the public actor, if their implementation can provoke a limitation of the other's freedom. We have to deal with a (structurally open) question, that cannot be answered once and for all. In other words, we have to face a problematic sphere for public policy and legal regulation implying consequences which are substantially new as well as potentially challenging for the maintenance of high standards of social integration within a community of subjects with an increasingly complex range of systemic needs and individual demands. Above all, such consequences do not appear to be fully understood.

Taking this issue seriously into account, we wanted to focus our attention on a specific point: we can increase our ability to understand—and react to—this entire problematic sphere only if we have the capacity and will to change or to deeply integrate our traditional conceptual vocabulary and our consolidated paradigms of intervention. If this essay contributes (even minimally) to raising awareness of the current debate on this point, it will have achieved its main goal.

A solution to the question of 'fair access' to robotic technologies requires going beyond a framing of the problem in terms of redistribution of economic resources within a society and instead requires that the question is approached as a matter of recognition of cultural and symbolic differences. This does not provide a solution to the robotic divide problem, but it offers in our view a more appropriate normative framework to deal with it.

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General Editors

ROGER BROWNSWORD, King's College London

Email: roger.brownsword@kcl.ac.uk

HAN SOMSEN, TILT, Tilburg University

Email: han.somsen@uvt.nl

Book Reviews Editor

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