

- 2) Help monitor the patients' health and behaviors.
- 3) Provide companionship and social interaction.

The first category, whose aim is assisting the elderly and their carers in daily tasks, range from the Japanese Secom's automatic feeding robot "My Spoon", to the Riba Robot (Robot for Interactive Body Assistance), able to pick up and carry humans from a bed to a wheelchair, all while recognizing faces and voices, and provided with communication capabilities. The most obvious advantage of relying on technology in this field is 'round-the-clock care', which improves also the quality of time elders spend with family members and friends, no longer focused on providing physical care and other services. Nevertheless, assistive robots are thought to possibly increase the person's feeling of objectification and lack of control over their own life, since older people are especially vulnerable to dignity loss, after losing decision-making capacities. Moreover, the reduction of the amount of human contact that they could receive, which is important because human interactions are proven to reduce stress and the hormones associated with it, that increase the chances of suffering from dementia. The scientific-proven phenomenon of social buffering displays how highly social mammals show better recovery from distress when in the company of conspecifics; social contact has clearly demonstrable biochemical effects on a person's body, especially elderly, therefore depriving them of it is considered unethical, for the health implication that social isolation has. The National Pensioners Convention, on February 2012, published a *Dignity Code*, identifying a variety of practices and actions considered intolerable against elderly, undoubtedly "treating older people as objects or speaking about them in their presence as if they were not there", "being abusive or disrespectful in any way" and "using unnecessary medication or restraints". In this regard, robots will never be a threat because they will never be too tired, stressed or overworked, to the point of displaying overreacting or dangerous behaviors; still, they will also never be able to feel real compassion, empathy or understanding. As these limitations seem clear, the definition of dignity is not and a necessary distinction has to be made between:

- Inviolable universal dignity (*Menschenwürde*), inherent part of being a human being, not dependent on anyone's behaviors, beliefs or circumstances.
- Aspirational dignity, depending on the context analyzed.

Falling into this last category, is the concept of *Dignity of Identity*, the one attached to one-self as an integrated and autonomous person, in relation to its past and future self, and to other human beings. This can be changed accordingly to the treatment they receive. In fact, an insensitive use of robots could lead to humiliation and loss of self-respect, in the case – for instance – of movement without permission and in an impersonal way, without the use of names. Accordingly to preferences. On the other side, if implementing such preferences would be possible, as well as knowledge of past lifestyles, the result could lead to an increased feeling of control over the surrounding environment.

The philosopher Martha Nussbaum developed the *Capability Approach* focused on social justice and inviolable dignity, in order to define what is necessary for a life to be considered worthy of its definition. The main focus of the study was what the individual is actually able to be and to do, in an environment that creates opportunities for everyone, but leaves freedom of choice in which to take or not. With this in mind, she highlighted *ten central capabilities*: (1) life, of a worth-living length; (2) bodily health, with adequate nourishment and shelter; (3) bodily integrity, as being able to move freely from place to place, secured from assaults; (4) senses, imagination, and thoughts, in freedom of expression and religious practice; (5) emotions, to feel for other people and things; (6) practical reason, to engage in critical reflection about one's own life; (7) affiliation, engaging in social interactions while maintaining bases of self-respect and equality; (8) other species, living with concern for animals, plants and nature; (9) play, to enjoy recreational activities; and (10) control over one's environment, being able to engage in politics, or to hold property rights, or again enter the working industry. Naturally, full maintenance of all is unobtainable when it comes to elderly's reduced physical and cognitive abilities, but these new innovations in Robotics can increase the access of vulnerable elderly to a broader set of 'substantial freedoms' and access to these capabilities.

Another ethical concern in this aspect is that often the use of technology and robots to take care of people, whether elderly, disabled or babies, is actually exploited to caregivers' benefits more than that of the person in actual need, just for the amount of work and costs reduction. On the other side, numerous cases have been reported, where caregivers did not treat their 'patients' with respect and the necessary care, meanwhile the implementation of robotic devices could empower the elderly and make them more independent, both in their physical and psychological welfare. Patients themselves have stated that doing things independently is incidental to their self-worth and they may actually prefer the assistance of a robot over a real person. From this perspective, robots could be seen as mere instruments and this could help the more sceptic or prideful

new technologies in the market. The institutionalization of a reliable system for responsibility determination, with legal norms and safety standards, then could possibly minimize the consequences, whether accidents would occur. This is another aspect where Japan and European societies diverge; first of all, Japanese safety culture can be seen from a double perspective: users expect the products to be safe for use, while manufacturers expect institutional safeguards against possible negative side-effects. On the other hand, in Western culture more emphasis is usually placed on those considered as fundamental and inviolable values of society, which must reflect on institutional governance of robot use as well as any other aspect of life. Undoubtedly, both societies present a responsibility gap problem, but in Japan said problem is overlooked because the main driver of the sector are the conjunct efforts of industries, government and academics, with little space given to legal actors. In Europe, these figures are directly involved in decision-making processes regarding research activities, products and obtained results, therefore they have a higher influence on the new industry. In the end, Japan aimed at safety authentication through a product certification system that is expected to enhance the safety of robot use, as well as limit the responsibility of manufacturers (for products that meet the official standard requirements). The lack of harmonious relationships and integration of robots in society, always felt as possible from Japanese perspective, is probably the reason why European countries always focused more on the concrete aspects of the ASP, as this relationship user-robot is seen as a mere interaction between individual entities, one of which is nothing more than an object.

Other relevant problematics to address are certainly related to robots' degree of autonomy, given that full autonomy of action in the healthcare sector is considered impractical, as decision-making and medication prescriptions cannot be handed over to robots, for ethical and legal reason, and the presence of human personnel will always be necessary. When it comes to energetical autonomy, instead, the more power is required to function the less autonomy is guaranteed, which will impact on the robot's 'working hours' and on energetical fees.

Next, robots will not be able to reach any time soon the current levels of human intelligence. Here interpreted as the ability to adapt to different real-world scenarios, at times unmapped or not fully in the understanding capabilities of the device, consequently limiting their options to find suitable solutions. This makes robots not entirely dependable, as every time they must re-learn and adapt to different new surroundings. Facilitating human-robot collaboration is therefore a primary need as robots are bound to engage with humans in a multiple variety of environments. To some degree, in certain contexts it should even be necessary for them to be able to understand human emotions, language and behaviours, which is a highly demanding expectation.

Talking about expectations and requirements, building multi-functional robots in this highly competitive business will be another challenge Robotics must conquer, as usually Industrial Robots were static and meant to carry out a single task at a time. In the multitasking and demanding sector that is healthcare, Service Robots could possibly perform multiple tasks, but at the expense of efficiency and efficacy, which could be dangerous in delicate circumstances, and the robot to perform so should be capable of recognizing and interacting with a wider variety of objects, people and environments. Lastly is the already mentioned question of privacy, mainly related to devices adopted with the scope of monitoring patients, which arises concerns on the storage and use of data acquired during the robot's "life".

4. Conclusions

The overall sector of healthcare presents high tensions when it comes to balancing providing good care and rising 'productivity' by increasing the number of patients, while at the same time limiting costs without reducing the quality of care. The lower wages and precarious working conditions of this sector are of common knowledge and also traits shared by most States. In Japan, this falls into the category of the *3K jobs* – considered *kiken*, *kitanai* and *kitsui*, meaning unsafe, unclean and tough on physical and mental conditions of employers. Introducing robots in the field will not only solve the issue of labour shortages, but it should also increase both the quality of life of patients as well as the working conditions of employees, for the many reasons and advantages listed in this report.

Quite often, the problematics related to the adoption of these devices in the field, whether in private household settings or nursing facilities, lay beyond technology itself, but in the reasons for its implementation and its subsequent use. In this case, prioritizing personnel's awareness and consciousness of their responsibility is more important than discussing whether a new product to place on the Silver Market will be worth financing. From this paper, it is clearly visible how the field of Robotics is an example of successful innovation for Japan