
Chapter 16

Biometrics, identity, recognition and the private sphere where we are, where we go¹

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Abstract

The need for recognition schemes is inherent to human civilization itself. Each epoch has been characterized by different identification practices and has posed different challenges. Today we are confronted with “identification in the globalization age”. Biometrics can be an important element of the answer to this challenge. With biometrics, for the first time in the history, human beings have really enhanced their capacity for personal recognition by amplifying their natural, physiological, recognition scheme, based on the appreciation of physical and behavioural appearances. Biometric technology can offer an identification scheme applicable at global level, independently of Nation States. Yet, when one speaks of global biometric identifiers, people immediately think of a nightmarish scenario, a unique world database, including billions of individuals, run by a global superpower. This is (bad) science fiction. We lack the technical and financial capacity, not to mention the international agreement, for creating such a database, which cannot exist today, and will hardly ever exist in the future. One could instead imagine a system based on many decentralized applications. An ongoing rhizome, made up of several distributed, interoperable, biometric databases, owned by local collaborative organizations and agencies. This system could increasingly support identity transactions on a global basis, at the beginning only in specific areas (e.g., refugees, migrants), siding traditional systems, and then, gradually, enlarging its scope and substituting old systems. This is expected to overturn many current ethical and privacy standards.

16.1 Introduction

In *Mimesis* [1], Erich Auerbach, the great German philologist, states that the whole Western civilization could be summarized in two great narratives, the tale of a man

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who spent 10 long years far from his homeland, travelling across the sea, and the tale of a man whom God once commanded “*Take your son, your only son, whom you love and go to the region of Moriah. Sacrifice him*” (*Gen. 22,2*).

Odysseus² and Abraham are the two fathers of the West, according to Auerbach. In his turn, Emanuel Levinas [2] argued that Odysseus’ journey, a long journey homecoming, represents the essence of Western thought, say, “*un retour à l’île natale – une complaisance dans le Même, une méconnaissance de l’Autre*”³ [2]. Levinas captures an important element, say, the relationship between journey, memory, and recognition. Recognition is essentially memory, and memory always implies nostalgia. To some extent, the Odyssey is anything but a long journey through the infinite nuances of memory and recognition. The poem starts with Odysseus, who incognito arrives among the Phaeacians as a refugee. Listening at a blind bard to sing a poem on the Trojan War, he cannot avoid bursting into tears, so revealing his identity. The hero tells as he wandered the sea for ten long years because of Gods’ punishment, after blinding the Cyclops Polyphemus. Odysseus was captured by the cyclops; asked his name, he answered “Nobody”. At the end, he succeeded in escaping, after blinding Polyphemus with a wooden stake. When, crying out and screaming, the cyclops asked for aid, other cyclops inquired “Who blinded you?” And Polyphemus obviously replied “Nobody”, making them puzzled and unable of taking action. Recognition was at stake also in another, sinister and nocturnal, episode, when Odysseus evoked the deads, who appeared as ghosts, totally unable to recognize anyone. Only when spirits drank the fresh blood of sacrificed animals, they recalled their memories, becoming again capable to recognize living people. Finally, the concluding part of the poem is completely woven into many different forms of recognition, starting with Argos, Odysseus’ faithful dog, which recognized his master, although the hero was disguised by beggar’s features. Odysseus, always disguised as an old beggar, revealed his identity to his wife, the queen Penelope, by showing that he knew that their conjugal bed was carved in an olive tree and rooted in the ground. Similarly, he identified himself with his old father Laertes, by describing the orchard that Laertes had once given him. The episode of the recognition between Odysseus and his old nurse, Eurycleia, was still more intriguing. Although the hero tried to keep his identity secret, the housekeeper recognized him through an old scar on his leg. The next day then, the situation was reversed, it was the turn of Odysseus to identify himself voluntarily by showing the old scar to some servants.

Also, Abraham took his identity carved on his flesh, his body was “written” by the sign of the alliance with God, the circumcision. The circumcision was much more than a sign carved on the flesh, it symbolically hinted at Isaac’ sacrifice. The momentous instant in which Abraham raised his knife over his son was already prefigured by the instant of the circumcision. There was an unavoidably short circuit of meanings between the two symbolic events. Words, flesh, and memory met themselves on Odysseus and Abraham’s bodies.

²I will use the original Greek name, Odysseus, instead of the more common Latin translation, Ulysses.

³A return to his native island, a complacency with the same, a misrecognition of the other (my translation).

Memory, body, and recognition are sides of the same multifaceted prism, identity. In this chapter, I will explore some aspects of such a prism. My aim will be two-fold (1) to sketch how they interact with biometric technology and (2) to suggest that biometrics are legitimate to become the main identity technology of the global digital society. To be sure, this theme would require a book rather than a book chapter. It will not be possible to support my arguments as they would require, and to provide all the elements necessary to assess them as they would deserve. The current paper will be more a suggestive journey through problems, cases, ideas, than a organized, logic, construction. If, at the end of this paper, the reader will pose himself questions that he never asked before, my goal will be reached.

16.2 Identity, identification, recognition

Let's start our journey with a brief discussion of the core philosophical implications of the concept of "identity" [3]. Identity is the state of being the same, the "*sameness in all that constitutes the objective reality of a thing: oneness*" [4]; if an object x is identical with an object y , it follows as a matter of necessity, that x and y are one and the same object. To put it another way, if "A" is a name of x , and "B" a name of y , "A" and "B" name the same object: that object is named twice but should be counted once. In this sense, every object is identical to itself and to nothing else. This statement could seem a truism, which does not pose any major problem: yet, since Plato, who dealt with it in the *Cratylus*, philosophers know that this notion conceals many paradoxes. In what a sense one could state that an item is identical to itself? If one considers two items taken synchronically, say, in the same moment of time, this statement would mean that we were initially wrong, there was only one item instead of two. In other words, an identity statement would simply mean to declare a misperception or misjudgement, otherwise we should admit that two might be contemporaneously one, which is a nonsense. If one considers instead two items taken diachronically, say, in different moments of time, the idea of identity would imply that they share essential qualities, temporally invariant, although they might differ in accidental qualities. This poses the question whether any atemporal essence might ever exist. Rigorously speaking, only God is one, always identical to himself and to nothing else, independently of contingency and time. This is expressed by the concept of *Tawhid*, pure and absolute "oneness," which is the notion at the heart of Islam; similarly, in Judaism, God is the completely unmixed being, whose attributes entirely coincide with His essence, *Ehyeh asher Ehyeh* (Exodus 3:14), "I am I am." Except God, all other beings cannot "be" in an absolute sense, they instead "have" contingent qualities. In human experience, all beings are immersed in the ceaseless flow of time, their qualities are always contingent. In conclusion, there are two possibilities (1) either non-contingent qualities – the core identity, the essence – exist, but they escape our sensory perception; or (2) all beings possess only contingent attributes, and therefore core identity and essence are illusive. If (2) is true, then the common belief in an unitary identity, permanent in time, is deceptive. Discussing these two, both legitimate, philosophical options is out of the scope of this

chapter; it is worth noting, however, that none of them excludes that there could be qualities stable enough, in the relevant period of time, to be considered, for practical and operational purposes, permanent or essential.

This assumption is the starting point of second possible philosophical approach to “identity,” which is based on assuming a weaker definition of identity, say, “*sameness of essential or generic qualities in different instances*” [4]. Philosophers call the strong definition of identity “numerical identity,” to mean that it concerns the true uniqueness of an item; and “qualitative identity,” the weaker one, to indicate that IT concerns only some attributes of an item, instead of the whole item. Two items “x” and “y” are *qualitatively* identical, when they are exactly similar with respect to some property they share. Monozygotic twins may be qualitatively identical in various respects but they are clearly two distinct individuals. It is worth drawing the attention on the fictional nature of qualitative identity. To keep on using the previous example, it is evident that two twins can be said “identical” only very roughly; at a more granular observation they differ in many essential aspects, including several physical features, like fingerprints and body symmetry. At the end, qualitative identity is a logic loophole invented to save the notion of identity, which would be otherwise untenable. The reason why we need to save the idea of “identity” is chiefly because we need to provide a foundation to the notion of “identification,” which is not an abstract concept, but it is a term describing a specific human activity and practice. In other words, I argue that the idea of identification does not descend from the notion of identity, rather it is vice versa; from existing recognition practices (identification), we generated the theoretical and metaphysical notion of “identity”.

“Identification” means treating an item as the same as another, consequently also the act of *recognizing* an item. The notion of identification always implies that something or someone, or some attributes, are treated as previously known (recognized). A totally unknown item, whose attributes are all totally unknown, cannot be identified because it could not be even thought. The idea of “absolute identification,” picking out an item as completely distinct from every other, truly and rigorously unique, is purely metaphysical and abstract from human experience. When we identify, we always consider only “qualitative identity,” the picking out of an object in terms of some property or quality that it possesses. Such qualities need not be indicative of the individuality or uniqueness of the individual in question. The distinction between identity and identification is, then, the distinction between who one is in essence (which is a metaphysical statement) and how (or in virtue of what) one may be recognized (which is a practical question).

Personal recognition is the process through which one identifies (recognizes) a human person; it has little to do with the (philosophical) notion of “personal identity”. Persons are usually recognized through patterns of signs and attributes. None of them is totally distinctive and permanent. I am not referring only to long-term degradation of all attributes, including those which are treated by biometrics as though they were unique and stable (e.g., fingerprints, iris). I am referring to the notion of quality in itself. Qualities are distinct features only considered in abstract. In real world, a quality does not exist separated by all others and by the context. Qualities are mixed, they emerge only from the relationship between the whole of

an object and a “sensor” (biological or mechanical). Sensor precision is always limited, both in biological sensory apparatuses and mechanical devices. It varies overtime, at different sites and according to different contextual conditions. This implies the practical impossibility that two or more human or machine observations might exactly match. Recognition is always by approximation and emerges from differences. The assumption that a unique identifier could ever exist is not only philosophically untenable, but it is also empirically impossible. In real life, we need a number of observations blended together to recognize an item, be a thing, or an animal or a person. This is the way in which human perceptive system works, and it is also the reason why biometric technology needs to generate and exploit “templates.”

In conclusion of this chapter, there are two points that should be retained.

1. Identity is a notion full of metaphysical implications, it should be handled with great care and if possible avoided; this is the approach chosen by the *Standards Committee 37 of the International Organisation for Standardisation/International Electrotechnical Commission Joint Technical Committee 1 (ISO/IEC JTC1 SC37)*, which defines “biometrics” as “*automated recognition of individuals based on their biological and behavioural characteristics*,” avoiding any reference to identity [5];
2. The claim that biometric identification would be inherently demeaning because it turns “the human essence” into digits [6], is fallacious because personal identification does not ascertain personal identities – provided that they exist – rather it is a social practice with the pragmatic purpose of recognizing someone in a given context, for some given reasons.

16.3 Personal recognition through human history

In this chapter, I will outline the history of human identification, with the goal to show that radical changes in the socio-economic also affect the way in which personal identities and identification practices are conceptualized. My main focus will be on the bodily aspects of identification practices, because of their relevance to biometrics.

Along centuries, personal recognition has been based on various and different schemes. The need for specific methods for identification is presumably connected with the birth of the first urban societies during the so-called “Neolithic Revolution.” Before this transition, human communities were probably made of few nomadic individuals, used to get their food by hunting, or fishing, and by gathering edible items, such as fruit and insects. Around 9,000 years ago, in the vast area once called “Fertile Crescent,”⁴ the mankind started to develop a new economic model based on farming, cultivated crops and domesticated animals [7]. The transition from an economy based on hunting and gathering, to an economy based on farming, implied

⁴It is an area, including Iraq, Syria, Lebanon, Cyprus, Jordan, Israel, Egypt, as well as parts of Turkey and Iran.

many epochal consequences, including the emergence of sedentary dwelling. Human groups gave birth to sedentary communities organized in small villages and towns. Farming economy also meant the creation of food surpluses, which promoted trade of food and food related products (e.g., salt, which was probably one of first commodities because of its ability to preserve food). The growing societal complexity, alongside the development of trade, presumably generated the need for recognition schemes beyond interpersonal contacts within each community. The first categories of people who needed to be recognized and to recognize were probably those who travelled, say, merchants, sailors, caravan travellers, and soldiers. Recognition was necessary for establishing trustful relationships with unknown strangers. The *Odyssey* offers an indirect evidence of this novel situation. The Homeric poems provide a nice list of the main identifiers used by early human communities. Distinguished Italian Medievalist and Anglist, Piero Boitani, used to argue that the *Odyssey* is the greatest summa of recognition practices in western literature, including descriptions of physical appearance (e.g., body size and shape, skin and hair colour, face shape, physical deformities and particularities, wrinkles and scars, etc.), artificial body modifications (e.g., branding, tattooing, scarification, etc.), physical objects (e.g., passes, seals, rings, etc.), and mental tokens (e.g., memories, poems, music, recollection of family and tribal links, etc.). Some of these recognition tools warrant a further examination for at least two reasons, first, because they are still in use; second, because they provided the early model for today technology. It is thus possible to learn lessons from them, which could be fruitfully applied to the present.

Let's start with tattoos, which have a bizarre double-nature, of cosmetic and body writing. Tattoos started to be associate with identification thousands of years ago [8]. The word is a borrowing of the Samoan word *tatau*, meaning to "strike something," but also to "mark someone." In the Pacific cultures tattooing had a huge historic and cultural significance, splendidly evoked by Melville in *Moby Dick's* character *Queequeg*, "*Many spare hours he spent, in carving the lid with all manner of grotesque figures and drawings; and it seemed that hereby he was striving, in his rude way, to copy parts of the twisted tattooing on his body. And this tattooing, had been the work of a departed prophet and seer of his island, who, by those hieroglyphic marks, had written out on his body a complete theory of the heavens and the earth, and a mystical treatise on the art of attaining truth; so that Queequeg in his own proper person was a riddle to unfold; a wondrous work in one volume; but whose mysteries not even himself could read, though his own live heart beat against them; and these mysteries were therefore destined in the end to moulder away with the living parchment whereon they were inscribed, and so be unsolved to the last.*" (*Moby Dick*, 110, 19). It is difficult to escape the impression that in these few lines Melville was able, as only poets and artist know, to get closer to the heart of the mystery surrounding the "written body."

Tattoos have had, however, a quite different description in the West. Tattoos were banned by traditional Jewish culture. In Jewish law, any body modification is forbidden by *Deut. 4:9,15*, except those made for protecting or restoring health. Also, ancient Greek civilization did not love tattoos as well as any other mark on the skin [9]. Aristotle defined recognition through body signs "*the least artistic form*" (*Poet. 1453b*) and Greeks were proud that their civilization used cultural signs for

people recognition rather than body marks. For them, the written body was almost a dead body. Greeks abhorred corpses, and artificial body signs were felt very close to corpse preparation for mortuary rituals. Greeks thought that living beings are by definition changing, only death is immutable. Thus, they were very suspicious towards any search for immutability. The observation of the impermanent nature of all human attributes and qualities was turned into a reflection on the fascinating, and ambiguous, relation between memory, body, and life. In Greek mythology, the deceased brought on his body the signs of the faults committed in life. When he arrived in the netherworld, his body was read by *Radamanthos*, the infernal judge, who wrote, still on the body, the punishment decreed [10]. The symbolism is transparent, our life is written on our bodies, through memories, wrinkles, scars, diseases, disabilities, and so; body are full of stories. The lesson to be learned is relevant also to us. Human bodies are never bare bodies, they have always, and unavoidably, a personal, biographical, dimension. Claiming that biometric technology strips human beings from their personal and biographical aspect, identifying people through their biological features, as they were animals [11], means to ignore the richness and complexity of human physicality.

Also, Romans despised tattooing, at least during the first centuries [8]. The Latin word for tattoo was "*stigma*," and Romans used to mark criminals and slaves, while citizens were identifiable through names. Names were extremely important in the Roman culture. The Roman Empire was the first society in the west providing for a universal identification system through a tripartite codified name scheme, connected to a comprehensive legal system of political citizenship [12]. The birth of the great empires, the Roman in the West and the Chinese in Asia, introduced new important drivers for personal identification, namely, taxation, conscription, and the administration of law [13]. In largely illiterate societies, it is unlikely that the birth of a class of public officers, capable for writing and tasked to tax, recruit, or bring to the court people, was happily accepted. The bad press that surrounds identification practices, and the deep rooted conviction that identification is always a way to curb people, is likely to date to this period.

The Modern Era, which started with the Reformation and the new geographic discoveries, was characterized by increased mobility of people and goods (the so-called first wave of globalization) associated with urbanization and, later on, industrialization. The need for different recognition schemes was due to urbanization and industrial work, two conditions that generated masses of people on the move, abandoning villages and the country, to move to cities and industries. With the industrial revolution, anonymity, almost impossible in medieval urban societies, and rural communities [14], became the standard condition for most individuals. The passage from the mediaeval identification scheme, based on community membership (e.g., family, guild, village, manor, parish, etc.), to a modern identification scheme, based on documents issued by the State, is crucial. Nation-States emerged from the political turmoil, which affected Europe for around a century. Nation-States had the primary need to affirm their authority, against transnational and global powers, such as the Roman Catholic Church and the cosmopolitan network of nobility. Nation-States' strategic move was to strip people from their communitarian identity. Communities were still largely controlled by religious authorities and nobility, it was then paramount that

the new citizen was an unmarked person, enfranchised from any community. Being a member of a given category or community was no longer relevant before the State. France was the place where this strategy was more successfully and comprehensively experimented [15]. In a few years, the French Republican government enacted the first legislation in the West linking personal identities to birth registration; introduced the principle of the *jus soli*, according to which “*any individual born from foreign parents could claim French citizenship if he was at least 21 years old and declared his will to become a Frenchman and to settle in France*” [15]; created a national Committee of Public Safety (*Comité de salut public*) tasked to protect national borders from expatriated aristocrats (*les émigrés*); established a wide network of surveillance committees, tasked to supervise the rigorous application of republican principles, to deliver citizenship certificates, to deal with immigration matters at local level [16]. Religion, ethnicity, race, cast, social conditions, were declared irrelevant to identify individuals, at least in theory.⁵ The Declaration of the Rights of Man and of the Citizen (*Déclaration des droits de l’homme et du citoyen*), passed by France’s National Constituent Assembly in August 1789, provided the theoretical foundation for this new system. It is worth reading its first articles [17], because they describe the relevant attributes of the ideal citizen of the Nation-State,

Article I – Men are born and remain free and equal in rights. Social distinctions can be founded only on the common good.

Article II – The goal of any political association is the conservation of the natural and imprescriptible rights of man. These rights are liberty, property, safety and resistance against oppression.

Article III – The principle of any sovereignty resides essentially in the Nation. No body, no individual can exert authority which does not emanate expressly from it.

Such a citizen is recognized by using only three simple coordinates, allowing to localize him in space and time, (1) place of birth, which provides critical information about nationality; (2) date of birth, which complements the previous piece of information and allows establishing citizen’s age, which is relevant to determine the rights that he actually possesses; (3) name, which is the token used in everyday life by the State to trace him. No further information is basically required, although further details can be added (e.g., residence, sex, profession, and so) but none of them is truly critical, as it is witnessed by the fact that only these three parameters are indispensable for birth registration almost everywhere, even today. Personal identification became necessary to demonstrate nationality, and consequently, to move across borders and to be fully entitled with political rights.

Finally, after World War II, a new powerful driver for personal identification emerged: the welfare state. The welfare state, which first appeared in north Europe, was based on the concept to provide all its citizens with a vast arrays of services,

⁵Actually, the history shows that most Nation-States kept on using identification schemes largely based also on racial, religious, ethnic, categories. The most horrible event of the twentieth century, the Shoah, was made possible chiefly by the existence of an effective bureaucratic apparatus for certifying racial identities.

free of charge, chiefly funded by the State via a redistributionist taxation. To be properly enforced, both redistributionist taxation and welfare provision needed robust and reliable systems for personal identification. As a consequence, welfare states progressively equipped themselves with an increasing number of identity and entitlement documents (e.g., social cards, social insurance numbers, etc.) and created huge bureaucratic apparatuses to manage public services and handle recognition systems. After civil and political rights, also social rights were progressively included among practices based on personal identification, hence making identification integral to most public services, including insurances, national health systems, tax offices, and so.

Here it is where we are, or, better, where we were till yesterday. There are two main concepts that one should retain,

1. History shows that personal recognition has always played an enabling role; it has allowed enforcing most social changes occurred in our civilization, including, 1) the naissance and development of long-distance trade and novel economic systems; 2) the birth of a legal system including civil and criminal codes; 3) the progress towards more social equity; 4) the enforcement of most liberty rights; 5) the promotion of social rights, e.g., the right to health, to employment, to housing, and so. To be sure, personal recognition has also partly contributed to the development of other, less positive, mechanisms, including more pervasive systems for social control and the proliferation of bureaucracies;
2. Interestingly enough, however, history also shows that very rarely personal recognition has been used to overpower and subjugate people. The misperception that personal recognition is integral to oppressive regimes, even to dictatorships, is chiefly based on a confusion between personal recognition and social categorization. Think of slaves in ancient Rome, they were tattooed and had no name, the tattoo was a sign of their category, it was not a true personal identifier. When a slave was freed, the first change in his life was to get a personal identifier, say, a name. Most crimes attributed to personal recognition, were perpetuated thanks to the development of parallel schemes for group categorization. This emerges with a compelling evidence from the period of French history immediately after the proclamation of the republic. In theory, the new definition of citizenship should have protected everybody against discriminating measures, and criminal law consented to prosecute people only on strict personal basis. Yet the system was structured for sorting out those who did not comply with the Republican government, notably the clergy still faithful to the Roman Church, and the landed gentry. These people were systematically exterminated, with the goal to eradicate their presence and cultural significance from the French society. The instruments used to sort out these “enemies of the revolution” were neither the new system for birth registration, nor the novel organization for delivering citizenship certification. They were identified by simply searching for people labelled as “priests” and “nobles” because of their way of dressing, or speaking, or their education [16].

16.4 Where are we going?

In this chapter, I will suggest that the global, digital, society needs an “identity revolution,” similar to those occurred with the agricultural and the industrial revolutions. I will take some examples from two cases, refugees and digital economies, to suggest that biometrics could be a building block of such an identity revolution. Finally, I will argue that most reasons of ethical and privacy concerns related to this evolution are probably misplaced, although there are still reasons to carefully supervise these processes.

The world has reached a degree of interconnectedness never experienced before. Billion persons are moving each year across large geographic distances, and still more people are interconnected through the Internet; a new economy, based on synchronic communication, extensive financialization, and the exchange of data, is rapidly advancing. This situation dramatically transcends national control and state regulations, and has having momentous consequences for the identification scheme emerged from the French revolution. In such a context, biometric technology could be used either to support obsolete schemes for personal recognition, or to promote innovative approaches to global identity management.

16.4.1 *Global mobility of people*

Although people mobility within and across national borders is not at all a new phenomenon, what is surely novel is its current dimension. This is due to a variety of factors, including large availability of geographical information; increasing cultural homologation, which makes easier and easier to interact among people belonging to different cultures; global commerce and increasing number of networks of global retailers, which makes possible to find the same products and services almost everywhere; global communication systems at no cost, or almost no cost; possibility to travel at relative ease and at low costs; border porosity in some world areas; diffusion of electronic payments. Global people mobility includes three main categories of people,

- Economic migrants: they include “a wide array of people that move from one country to another to advance their economic and professional prospect” [18]. According to the United Nations *the number of international migrants worldwide has reached 244 million in 2015* (3.3% of the world’s population) [19]. Most economic migrants are legal migrants, yet a part of them are not. Illegal aliens are foreigners who (1) have illegally entered a country or (2) have entered a country legally, but who no longer hold a valid residence permit. At least 50% of illegal aliens, both in the US and in the EU, are *undocumented immigrants*, say, foreigners who have crossed borders legally, but are resident under false pretences. For instance, they entered a country with a tourist visa although they intended to work; or their residence permit has expired and was not renewed; or they lost their refugee status. Undocumented immigrants are not necessarily all criminals, at worst, according to some jurisdictions, they are guilty of an administrative

offense related to their failure to fulfil specific administrative requirements to stay in the country of destination.

- Refugees and displaced people: the term “refugee” refers to “*people who have had to abandon or flee their country of origin as a result of serious threat to their lives or freedom such as natural catastrophe, war or military occupation, fear of religions and racial or political persecution*” [20]. According to United Nations High Commissioner For Refugee (UNHCR) [21], there are in total 65.3 million people who had been forced to flee their homes worldwide, they include *internally displaced people*, who have been displaced within their country’s borders (40.8 million in 2015); refugees, people to whom at has been granted the refugee status (21.3 million in 2015); *asylum seekers*, people who are seeking international protection but whose refugee status is yet to be determined (3.2 million in 2015); and *stateless people*, who (for various reasons) do not have the nationality of any country (10 million in 2015). Refugees and asylum seekers are legally defined by national legislations, in accordance with the international legal framework provided by the 1951 Geneva Convention Relating to the Status of Refugees and its 1967 Protocol [22]. At the core of this framework, there are two principles: (1) the right to asylum, conceived as a fundamental human right; (2) the principle of non-refoulement, which means that refugees cannot be forcibly returned to places where their lives or freedoms are threatened.
- Global travellers: they include tourists, business people, academics, students involved in international exchange programmes, people working in international organizations and NGOs, people working in multinational companies. According to the World Travel Monitor [23], in 2016 there have been 1 billion international trips, while in 2015 the World Tourist Organization has calculated around 1.2 billion international tourists [24].

16.4.1.1 Difficult challenges

Economics migrants, refugees, asylum seekers and alike are perceived by most politicians, the media, and part of the public as one of the most severe challenges posed by global mobility. This is only partially true. Migration is as intertwined with other problems (e.g., economic globalization, cultural homologation, international terrorism, internal security, and so) as to become an ideal “scapegoat.” Yet, without 1 billion international travels per year, the global scenario could be quite different. When one seventh of the world population is on the move, this means that something epochal is happening, transcending the issue of immigration. Mobile people, no matter if they are tourists or refugees, must be provided with recognizable and reliable identifiers to guarantee them basic rights and empower them with basic capacities, e.g., using a credit card, signing a form, purchasing a flight ticket, etc. They must be protected from terrorism and criminal attacks, and, in the same time, terrorists, or other criminals should be preveted from infiltrating them. This huge amount of people is too large to be handled with traditional means, and they can be managed only by modern recognition technologies, such as biometrics. Large-scale biometric applications for border control, meet this need, being a way to automatize and speed up old, established,

procedures. Yet, challenges posed by global mobility cannot be addressed within the traditional legal and political framework, they require a paradigm shift.

The population of migrants is very heterogenous and not so easily recognizable. Among them, asylum seekers should be distinguished from other categories of foreigners to grant them the refugee status. Although the 1951 Convention does not explicitly prescribe that asylum seekers' applications are assessed on an individual basis, in most cases there is no alternative. On the one hand, there are situations that can be evaluated only at individual level (e.g., someone who claims to be persecuted in his country of origin); on the other hand, applications could be rejected only at individual level to comply with the principle of nonrefoulement, which prevents collective deportation. Of course, there is always the possibility of collective admissions, which are not prevented by the 1951 Convention, but even in this case personal identification is inevitable. Think for instance of the collective admission of people fleeing from a war zone. They should prove at least that they truly come from the war zone. However, they could also be legitimately requested to demonstrate that they are not militants involved in the massacre of civilians. This is because the 1951 Convention does not apply to people who have committed a crime against peace, a war crime, a crime against humanity or a serious non-political crime. Moreover, the 1951 Convention bestows upon refugees some rights and obligations. Negative rights (e.g., freedom of speech, freedom of religion and freedom of movement) and obligations (e.g., respecting laws of the hosting country and complying with measures for the public order) could in principle also be applied to undocumented people, but positive rights (such as the right to work, to housing, to education and to access the courts) can be claimed only by people who are able to document their personal identity. Refugees also need to be able to document their identity to allow authorities track and monitor them, because the refugee status is not necessarily permanent. Finally, transnational criminals and terrorists could try to exploit the 1951 Convention to infiltrate a country. Making refugees personally identifiable could help prevent infiltration, expose criminals and monitor suspects.

However important the reasons to determine the personal identity of refugees, we are confronted with a number of difficulties. First of all, when refugees arrive, they may not have an identity document. They sometimes throw away their IDs to avoid disclosing their names, fearing for themselves and their relatives. People fleeing from war or military occupation may have the same problem. Refugees who have escaped natural disasters have sometimes lost their documents. Moreover, children are often undocumented because they were not registered at birth. According to UNICEF [25], 230 million children worldwide are unregistered, which means approximately one in three of all children under five around the world.

Finally, among "true" refugees there could be also "false" refugees, who are undocumented because they destroyed their IDs to hide their nationality, place of birth or age. However, even when refugees do hold a valid ID, this is often not enough. According to the UNHCR, 54% of all refugees worldwide came from three countries: Syria, Afghanistan, and Somalia. An ID is reliable as long as it is linked through an unbroken chain, granted by the civil register or a birth certificate. It is apparent that in Syria, Afghanistan and Somalia, as well as in many other countries,

there is no longer an effective civil register system. Generally speaking, the civil register system is unreliable in most refugees' countries of origin, because building an effective system requires resources and bureaucratic structures often beyond the reach of low income countries. The recognition system originated from the French revolution is based on two pillars, (1) reliability of birth certification and (2) continuity and self-consistency of civil registration. Together, they imply that (1) babies are registered almost immediately after birth; (2) registration is performed in a reliable and transparent way, by trained personnel; (3) certificates are securely stored, and protected against any alteration over time; (4) civil registers are regularly updated and protected against alterations; (5) identity documents are checked for consistency with civil registers and birth certificates; (6) it is always possible to link back identity documents, civil registries, and birth certificates. Most of these conditions are not truly ensured by many low-income countries and there is little hope that they could be ever ensured in the future.

Lastly, there is also a minor issue that is worth mentioning. Many non-western languages use writing systems different from the Latin alphabet. This means names have to be transliterated. Transliteration is rarely unique; for instance, the name "Muhammad" can be transliterated from Arabic to the Latin alphabet in at least eight different ways. This may generate confusion and could enable the same person to submit multiple applications using differently transliterated original documents.

16.4.1.2 Providing refugees with biometric identifiers

The idea to use biometrics in refugee management dates to the late 1990s. The most obvious application concerns the use of biometrics at border checkpoints, where biometric data helps match entry and exit records and augments normal watch list used to provide IDs to undocumented refugees and refugees whose original IDs were not considered reliable. The UK and Dutch governments were among the first to use a central biometric database to manage the application, return and re-integration programmes for asylum seekers.

The effective management of refugees and asylum seekers is particularly difficult in Europe. The creation of a vast area of free movement of people (the 26 countries that abolished border control at mutual borders as per the year 2017) without a corresponding political and administrative union has resulted in an odd situation. This area of free movement, coupled with the lack of common criteria for assessing asylum applications, created so-called "asylum shopping." Asylum seekers, whose applications were rejected in a given EU country, applied in another EU country, and then in another, until they found a country that granted them refugee status. Once they were accepted in a country, they moved to other EU countries, including those that initially rejected their applications. This problem was addressed with the adoption of an EU-wide information technology system for the comparison of fingerprints of asylum seekers (European Dactyloscopy, EURODAC) in December 2000, which became operational in January 2003. EURODAC enables EU Member States to track foreigners who have already filed an asylum application in another Member State. The EURODAC regulation was recently amended to allow law enforcement access

to the fingerprints database (according to the previous regulation, the system could be only searched for asylum purposes). EURODAC was not, however, a panacea. Collecting the fingerprints of all fingers of every applicant – as requested by the system – is hardly possible on the spot (think of boat people). Moreover, people could refuse to give their fingerprints and, according to 1951 Convention, they cannot be denied entry for just that reason. The practical difficulty in collecting biometric data on the spot and transmitting it to the Central Unit of EURODAC (which should be done within 72 h) inevitably delays the verification of an asylum seeker's data. This time gap could be – and has been – exploited to escape controls [26]. During this so-called European migrant crisis [27] EU leaders proposed to create a web of biometric hotspots for the swift identification, registration and fingerprinting of migrants, suggesting national border authorities use proportionate coercion in case of refusal to give fingerprints.

In the meantime, also international organizations have considered using biometrics to document refugees' personal identity. In 2014, the World Bank Group presented the Identification for Development Initiative, aiming “*to help countries reach the recently adopted Sustainable Development Goal target of ‘providing legal identity for all, including birth registration, by 2030.’*” [28] The UNHCR launched a plan to provide displaced persons with biometric ID cards. After initial experiments in Senegal and Malaysia, in 2015 the UNHCR announced they had developed the Biometric Identity Management System (BIMS). This system for scanning and registering fingerprints and facial and iris images is already available in Apple and Android app stores [29]. These three biometrics are stored with biographic data on cards and in a central database in Geneva.

The UNHCR's BIMS could become the blueprint for a global ID system. A global ID scheme should not necessarily replace national ID systems, which could still work locally, but it could become a supranational scheme that facilitates cross border mobility, while raising security standards. Moreover, a similar scheme applied to countries whose birth registration system is not reliable could provide a solution to this problem. The Indian Aadhaar Biometric Identification Program [30], although with different goals and managed at State level, is extremely interesting and deserves to be carefully studied.

16.4.2 Digital economy

Together with global mobility, digital economy is the second powerful driver, leading to new recognition schemes. Libraries have been written in the last decades on digital economy, and it would not be worth repeating concepts better explored by other authors [31]. There is, however, an issue worth mentioning.

It concerns the very heart of the digital revolution, say, data. Immateriality of production is one of the main features of the information society. Knowledge, information, communication, relationships, emotional responses are the intangible, immaterial, financial assets of the information society. Personal information is no longer private but has become detachable and marketable through the use of Information Communication Technology (ICT). These processes correspond to the

birth of a new commodity, data. What is data? Data is measured information. New ICT has allowed developing technological devices and metrics to turn qualitative information into quantitative information, say, data. The digital nature of data makes it easily storable, transferable, and marketable. During the agricultural revolution, and the industrial revolution, the economic transition was led by the “commodification” of a natural item, turned into a marketable product. Animals and plants existed well before the Neolithic revolution, but only when humans developed the technology to domesticate animals and cultivate plants, they became commodities. The commodification of animals and plants took millennia to spread from the Fertile Crescent to the rest of the world, generating myriads of dramatic transformation, affecting almost each aspect of human civilization. Something similar happened with the industrial revolution. Human labour had always existed, and humans had always sold their job. Yet, before the industrial revolution, no one used to sell his working time, which is the new commodity “invented” by the industrial revolution. The fundamental difference between a medieval and an industrial worker, is that medieval workers sold their skills, their products, their labour, while the industrial worker sells his working time. The enabling technology that supported the industrial revolution was the mechanical clock, which turned time into a measurable item, and into a commodity. This contributed to generate new concepts of human work, life, and identity, providing the foundation to that cultural transition, which got to completion with the French revolution. It took centuries to realize the transition from the agricultural to the industrial civilization. Today, we are witnessing transformations that are rapidly affecting people all over the world, spreading in few days from Paris to Tokyo, from Los Angeles to Delhi. The whole world economy is changing its structure, undergoing to increasing financialization and virtualization. National currencies are becoming more and more abstract, they are mathematical formula devoid of materiality, backed by a web of electronic transactions. They are no longer the expression of the richness of a Nation. The new virtual economy still lacks its gold standard. Identities could become such standard because they are the most valuable commodity of the digital world. This implies the need new definitions of identity, identity data, personal data, private sphere, privacy rights and data protection.

16.5 Privacy, person and human dignity

Privacy is the third epochal driver demanding an identity revolution. The debate surrounding biometrics has often focused on personal data protection, I am not convinced that this is the real challenge. To be sure, it is extremely important to protect biometrics data, which are personal and – according to the General Data Protection Regulation of the EU – *by default* sensitive. Yet, the crucial point is the redefinition of the cultural notion of privacy. Privacy is often conceptualised in normative (legal and ethical) and political terms. In this chapter, I will focus on psychological aspects of privacy. My goal is to ground the concept of privacy on the notion of human (bodily, psychologically, socially) integrity instead of on personal data.

The earliest form of polarity between public and private spheres can be probably traced to early infancy. In early developmental stages infants hardly distinguish between themselves and the environment [32]. States of wholeness, timelessness and oneness alternate with states in which the awareness of space, time and separateness, slowly emerge. Through mother's body, the infant starts exploring the world and perceiving a distinction between the inward and the outward. The inward is what is evident only to the subject, and can become evident to others only if it is communicated. This is likely to be the earliest experience of what will become later the notion of privacy, which therefore implies that (1) some experiences can be kept separated, even hidden; and (2) the inner, private, world is bridged with the outer, public, world. Inward and outward are in a mutual, ongoing, dynamic communication, and the main difference between private and public spheres does not dwell in any specific content but in the different rules that govern the two realms. A total discontinuity between private and public experiences would coincide with autism, which is indeed a true "pathology of the private sphere" [33].

Growing up, the polarity between private and public is often described in spatial terms. Space (physical and virtual) is variously segmented, also according to the degree of control or influence exercised over it by each individual. Ethologic studies show that most animals tend to have outside boundaries of their movement during the course of their everyday activities. Also human beings tend to segment the territory around them [34]. In the inner circle there is an area that is perceived to be private, which is commonly called "personal space." Most people feel discomfort when their personal space is violated, and personal spaces can be trespassed only in particular circumstances and only by selected others. This mechanism is rooted in neurophysiology, as it has been demonstrated by individuals who lack reactions to personal space violations and also show lesions of a small cerebral region involved in emotional learning and memory modulation, the amygdale [35].

A third, important step, in the internal construction of the private sphere, is the naissance of feelings of intimacy, shame and modesty. These feelings are deeply influenced by the cultural context, yet they are universal. They could regard completely different, even opposite, behaviours, body parts, and social situations, but in their elementary structure they are always similar. Everywhere offending intimacy, shame and modesty causes intense emotional reactions. There is a very strict connection between these sentiments, the perception of a private sphere, and the idea of dignity. All experiences in which intimacy, shame or modesty are offended and not respected, imply some components of degradation, Primo Levi, in *The Drowned and the Saved*, argues that degradation destroys the sense of worth and self-esteem generating humiliation. "To be humiliated means to have your personal boundaries violated and your personal space invaded." My argument runs as follows, 1) psychologically speaking, the main difference between private and public spheres is in their internal rules; insisting too much on data contents could be misleading; 2) the tension between private and public spheres is essential to personal recognition and self-recognition of individuals; 3) any breach in personal integrity (physical, psychological, social) is a privacy breach; 4) psychologically speaking, privacy breaches always entail humiliation; humiliation and privacy breaches are the two sides of the same coin; 5) data protection – including

personal and biometric data protection – affects property rights, while respect for privacy concerns the fundamental right to dignity.

The *EU Charter of Fundamental Rights* [36] has captured quite well this idea. Privacy is primarily addressed in Articles 7 and 8, which explicitly concern privacy, family life, and data protection. Yet, from a careful reading of the Charter, it emerges that the protection of privacy is addressed also in the first, most important, chapter devoted to Human Dignity. The Article 3 on the *Right to the integrity of the person*, reads:

1. Everyone has the right to respect for his or her physical and mental integrity
2. In the fields of medicine and biology, the following must be respected in particular: the free and informed consent of the person concerned, according to the procedures laid down by law [...]

The context in which Article 3 is collocated points out that “*the dignity principle should be regarded as a tool to identify the cases in which the body should be absolutely inviolable*” [35] and that consequently “*the principle of inviolability of the body and physical and psychological integrity set out in Article 3 of the Charter of Fundamental Rights rules out any activity that may jeopardise integrity in whole or in part – even with the data subject’s consent.*” [37] Body integrity is violated any time that an undue and unsolicited intrusion “penetrates” the individual’s private sphere, independently from whether such an intrusion is tactile, visual, acoustic, psychological, informational, etc. or whether it produces physical injuries or dissemination of personal information.

16.5.1 Is biometric inherently demeaning?

Since the early 2000s, scholars, philosophers, ethical committees have warned against the risk that biometrics could irreparably offend human dignity. For instance, in 2007, the French National Ethics Committee published an opinion on biometrics, which reads inter alia, “*Do the various biometric data that we have just considered constitute authentic human identification? Or do they contribute on the contrary to instrumentalizing the body and in a way dehumanizing it by reducing a person to an assortment of biometric measurements?*” [38].

This question was first formulated by the prominent philosopher Giorgio Agamben, who argued that gathering biometric data from refugees and other vulnerable groups is a form of tattooing, akin to the tattooing of Jewish prisoners in Auschwitz [39]. Agamben argued that what makes human life (*bios* in ancient Greek) different from animal life (*zoe*, in ancient Greek) is its historical, biographical dimension. There are times, he argued, when rulers create indistinct zones between *bios* and *zoe*. In these areas, humans are stripped of everything except the fact that they have a bare life. “*No human condition is more miserable than this, nor could it conceivably be so. Nothing belongs to us anymore; they have taken away our clothes, our shoes, even our hair; if we speak, they will not listen to us, and if they listen, they will not understand. They will even take away our name.*” [39]. In Auschwitz, prisoners’ names were substituted by numbers as brands on livestock. To Agamben, this is the deeper sense behind the adoption of biometric recognition schemes at global scale.

Refugees, Agamben suggested, are only at the first step in a process that is going to affect everybody. The global citizen would be progressively treated as, and consequently turned into, a branded beast – maybe satisfied and well-fed – but destined to slaughter.

Agamben's argument is weak. The distinction between biographical and bare life is a fallacy, bare life does not exist in humans (and this author suspects that it does not exist even in animals). Human bodies are words made flesh, they are embodied biographies, as I tried to suggest along all this chapter. Second, it is true that biometrics digitalize (quantify) human attributes, once considered only from a qualitative point of view. Yet, if this meant “de-humanizing” a person, stripping him from his biographical dimension, most current medical diagnostic would do the same. Finally, the comparison with Nazi tattoos and extermination camps is abusive. As Mesnard and Kahan demonstrated [40], Agamben speciously selected some elements of life in camps, neglecting others, to demonstrate his thesis. It is true that prisoners were only identified by numbers, and this was an extreme humiliation imposed to them, but it is enough to read Primo Levi to understand that the perverted mechanism of the extermination camp was much deeper and subtler. Agamben overlooked the specific horror of the extermination camp, which could not – and should never – be compared to trivial situations, such as getting the US VISA, the event which stimulated his reflections. In a sense Agamben was, however, right, biometric identification can be used to humiliate people. Systems can be intrusive, physically or psychologically or socially, with the result to violate people feelings of intimacy in the widest sense. Yet, this is often due to operational procedures, rather than to technology per se. Very rarely devices are designed in such a way to be intrusive by default. More often, they are operated by operators who use, or set, them in intrusive and humiliating ways (e.g., by regulating the system in a way which obliges the subject to take an uncomfortable, or ridiculous, or degrading, physical position). Unfortunately, most privacy impact assessments ignore operational procedures, only focusing on technology.

Another reason for concern surrounding biometrics, regards the creation of centralized databases. It is true that centralized databases may increase security risks. If they are compromised, the entire identification system is threatened. Moreover, large centralized biometric databases are an easy target for hackers and other malicious entities, also because designers – in order to prevent system failure – often build in high redundancy in parallel systems and mirrors, thereby adding further vulnerabilities. Centralized databases also raise the risk of function creep, which is the term used to describe the expansion of a process or system, where data collected for one specific purpose is subsequently used for another unintended or unauthorized purpose. When function creep results from a deliberate criminal intention, it represents a serious ethical, sometimes also legal, offence. Even in democratic societies, there is always the risk that a public authority uses a central biometric database for its hidden agenda, such a monitoring specific religious or ethnic groups. This risk would be magnified in case of a global ID scheme, a nightmarish scenario for most privacy advocates. The words devoted to this issue by a UNESCO Report [41] well summarize this point,

If the international system did embrace extensive use of biometrics or another globally unique identifier, the move could signal the effective end of anonymity. It would become feasible to compile a complete profile of a person's activities (...) This death to anonymity would meanwhile be coupled with asymmetry in information: the individual's every move could be monitored, yet he may not have any knowledge of this surveillance. Beyond privacy, such a state of affairs does not bode well for the exercise of other fundamental freedoms such as the right to associate or to seek, receive, and impart information – especially as the intimidation of surveillance can serve as a very restrictive force.

Technical concerns regarding the creation of centralized biometric databases could be partly overcome using blockchain technology. The blockchain technology is chiefly known as the technology that underpins Bitcoin and other cryptocurrencies. A blockchain is a distributed database that keeps an ongoing list of transaction records protected against manipulation and revision. It consists of data blocks, which each contain batches of transactions, a timestamp, and information linking it to a previous block. Blocks can be used to prove ownership of a document at a certain time, by including a one-way hash of that document in the transaction. Any electronic transaction can be certified through a blockchain. Individuals could record any document that proves their identity on the blockchain. The structure of the blockchain guarantees that the chain between the original document and the transaction based on that document remains unbroken. Information in the blockchain does not need to be guaranteed by a third party (i.e., local community, state bureaucracy, international organizations) nor does it need to be stored in a centralized database. There are currently several applications in development, which couple biometrics and blockchain technology [42]. Most of them use the blockchain to secure biometric information and prove its integrity. Once secured, encrypted and unusable for any other purpose, biometric data is definitely more manageable. In 2015, BITNATION, a decentralized, open-source movement, launched the "*BITNATION Refugee Emergency Response*," an application still in its embryonic stages that would provide refugees and asylum seekers with a "Blockchain Emergency ID" and "Bitcoin Debit Card" [43]. An individual's biometrics would be included in the blockchain and then used to issue both an ID and a debit card. The goal is to provide refugees with a political and financial solution without relying on hosting country resources or on international organizations. "*(We) out-compete governments by providing the same services cheaper and better through the blockchain*" according to Susanne Templehof, founder of BITNATION [44].

The blockchain network is trustless and decentralized. National or international institutions, global corporations and any other central authority, would not be any longer necessary to manage biometric large scale applications and the very idea of "large scale application" would be overturned. Biometric information would be secured within the blockchain, making theft and forgery of biometric details highly unlikely. Finally, the blockchain could provide higher data granularity, which is a

precious feature in databases that store multiple biometrics and non-biometric information. Higher data granularity means that one could operate on smaller, and more focused, pieces of information, thereby limiting the risk of function creep and data leakage. One could imagine a system based on many decentralized, interoperable, applications. An ongoing rhizome, made up of several distributed, biometric databases, owned by local collaborative organizations and agencies. This dispersed, non-hierarchical, system could increasingly support identity transactions on a global basis, at the beginning only in specific sectors (e.g., refugees, migrants, international travellers), siding traditional systems, and then, gradually, enlarging its scope, substituting old systems.

16.6 Conclusions

When one speaks of global biometric identifiers, people immediately think of a nightmarish scenario, a unique world database, including billions of individuals, run by a global superpower. There is a conspiracy theory, which claims that the United Nations have a plan to mark through biometrics the whole world population with the devilish number 666, the “mark of the beast”. Even the emergence of such a conspiracy theory demonstrates that a novel, global, recognition scheme is urgent. In a world with 7.3 billion people, one exists only if someone else recognizes you; “*Esse est agnitum*,” “being is being recognized,” paraphrasing a famous nineteenth century philosopher, George Berkeley. People obsessed by conspiracy theory are people who cannot put up with the idea of being totally ignored, of being only anonymous individuals in a huge, anonymous, global crowd. They need to fantasize that the Big Brother is putting them under surveillance, ignoring that in Orwell’s novel only 1% population, the members of the party, were constantly monitored. The majority of the population was “simply” manipulated by pervasive propaganda and fake news.

This global crowd is now on the move, across nations and continents and the whole architecture of the human fabric is in turmoil. Still more people are interconnected through electronic highways, where they do business, meet other people, find new jobs, learn foreigner languages, search for books, friends, and restaurants, and review them publicly. People use their mobiles for paying, PayPal is more used than American Express, money travels at the light speed across the world, whole countries are abolishing cash money. This new, global, nomadic, population needs to establish trustful relationships, to travel, to make business, to purchase online, to resettle themselves after a disaster, or fleeing from a war zone. They all want to minimize risks, to maximize opportunities. Their perception of what is their private sphere, of what is public and what is private, is rapidly changing, also because private information has become a marketable commodity. They demand to be respected and never humiliated. Advanced personal recognition schemes are fundamental to achieve these goals. There are thus three main challenges, 1) global nomadism; 2) digitalization and economic virtualization; 3) human dignity and integrity. Biometric could provide the technical framework to address all of them. A huge question mark still remains, who will ever provide the political framework?

References

- [1] Auerbach E. *Mimesis: The Representation of Reality in Western Literature*. Princeton, NJ: Princeton UP; 1963.
- [2] Levinas E. *Humanisme de l'autre homme*. Paris: Fata Morgana; 1972.
- [3] Harold N, Curtis B. Identity. In Zalta EN, editor. *The Stanford Encyclopedia of Philosophy*. Spring Edition; Stanford; 2017.
- [4] Merriam Webster. *Dictionary Merriam Webster*. 2015. [Online]. [cited 2017 June 5]. Available from: <https://www.merriam-webster.com/dictionary/identity>.
- [5] Wayman J, Mciver R, Waggett P, Clarke S, Mizoguchi M, Busch C. Vocabulary harmonisation for biometrics: the development of ISO/IEC 2382 Part 37. *IET Biometrics*. 2014; 3(1): p. 1–8.
- [6] European Group on Ethics in Science and New Technologies to the European Commission. *Opinion N.28 – Ethics of Security and Surveillance Technologies*. Brussels; 2014.
- [7] Bellwood P. *First Farmers: The Origins of Agricultural Societies*. London: Blackwell; 2004.
- [8] Gilbert S. *Tattoo History. A Source Book*. New York: Juno Books; 2001.
- [9] Andrieu B. *Les cultes du corps*. Paris: L'Harmattan; 1994.
- [10] Chesson M. Social memory, identity, and death: anthropological perspectives on mortuary rituals. *Archeological Papers of the American Anthropological Association*. 2001; 10(1): p. 1–10.
- [11] Agamben G. *Homo Sacer. Il potere sovrano e la vita nuda*. Torino: Einaudi; 1995.
- [12] Mordini E. Life in a Jar. In Mordini E, Green M, editors. *Identity, Security, and Democracy*. Brussels: IOS Press; 2008. p. vii–xv.
- [13] Scheidel W, editor. *State Power in Ancient China and Rome. Oxford Studies in Early Empires*. New York: Oxford University Press; 2015.
- [14] Caplan J, Torpey J, editors. *Documenting Individual Identity: The Development of State Practices in the Modern World*. Princeton: Princeton UP; 2001.
- [15] Berdah JF. Citizenship and National Identity in France from the French Revolution to the Present. In Ellis S, Eßer R, editors. *Frontiers, Regions and Identities in Europe*; Edizioni Plus. Pisa University Press. Pisa: 2009. p. 141–153.
- [16] Lapiéd M. Le rôle des comités de surveillance dans la circulation de l'information, à partir de l'étude des comités du Sud-Est. *Annales historiques de la Révolution française*. 2002; 330: p. 29–29.
- [17] Conseil Constitutionnel. *Declaration of Human and Civic Rights of 26 August 1789*. [Online]. 2002 [cited 2017 May 13]. Available from: http://www.conseil-constitutionnel.fr/conseil-constitutionnel/root/bank_mm/anglais/cst2.pdf.
- [18] Semmelroggen J. The difference between asylum seekers, refugees and economic migrants. *The Independent*. 2015 August 18.
- [19] United Nations. *International Migration Report 2015*. Department of Economic and Social Affairs, Population Division; 2016. Report No.: ST/ESA/SER.A/375.

- [20] Humburg J. Refugee. In Bolaffi G, editor. *Dictionary of Race, Ethnicity and Culture*. London: Sage; 2003.
- [21] UNHCR. *Global Trends. Forced Displacement in 2015*. Geneva: United Nations High Commissioner for Refugees; 2016.
- [22] UNHCR. *The 1951 Refugee Convention*. [Online]. 2017 [cited 2017 April 4]. Available from: <http://www.unhcr.org/1951-refugee-convention.html>.
- [23] IPK International. *World Travel Monitor*. [Online]. 2017 [cited 2017 June 5]. Available from: <http://www.ipkinternational.com/en/world-travel-monitor>.
- [24] CNN. *International Tourists Hit Record 1.2 billion in 2015, says UNWTO*. [Online]. 2016 [cited 2017 June 3]. Available from: <http://edition.cnn.com/travel/article/international-tourists-2015/index.html>.
- [25] UNICEF. *Every Child's Birth Right: Inequities and Trends in Birth Registration*. [Online]. 2013 [cited 2017 February 21]. Available from: http://www.unicef.org/mena/MENA-Birth_Registration_report_low_res-01.pdf.
- [26] Frontex. *Risk Analysis for 2017 – Europa EU*. [Online]. 2017 [cited 2017 May 5]. Available from: http://frontex.europa.eu/assets/Publications/Risk_Analysis/Annual_Risk_Analysis_2017.pdf.
- [27] Teitelbaum M. *Europe's migration dilemmas*. *Foreign Affairs*. 2017 May 11.
- [28] World Bank. *Identification for Development*. [Online]. 2015 [cited 2017 May 9]. Available from: <http://www.worldbank.org/>.
- [29] UNHCR. *Biometric Identity Management System. Enhancing Registration and Data Management*. [Online]. 2015 [cited 2017 June 5]. Available from: <http://www.unhcr.org/550c304c9.pdf>.
- [30] Parussini G. *India's Massive Aadhaar Biometric Identification Progra*. [Online]. 2017 [cited 2017 June 20]. Available from: <https://blogs.wsj.com/briefly/2017/01/13/indias-massive-aadhaar-biometric-identification-program-the-numbers/>.
- [31] Goldfarth A, Greenstein S, Tucker C, editors. *Economic Analysis of the Digital Economy*. Chicago: Chicago UP; 2015.
- [32] Winnicott D. *Human Nature*. London: Free Association Books; 1988.
- [33] Blanco IM. *The Unconscious as Infinite Sets*. London: Duckworth; 1975.
- [34] Hall E. *The Hidden Dimension*. London: Anchor Books; 1966.
- [35] Kennedy PD, Gläscher J, Tyszka J, Adolphs R. *Personal space regulation by the human amygdala*. *Nature Neuroscience*. 2009; 12: p. 1226–1227.
- [36] European Parliament – The Council and The Commission. *European Charter of Fundamental Rights, 2000/C 364/01*. Brussels; 2000.
- [37] European Group on Ethics in Science and New Technologies to the European Commission. *Op. N° 20, Ethical Aspects of ICT Implants in The Human Body*. Adopted on 16/03/2005; Brussels: 2005.
- [38] CNB. *Biometrics, identifying data and human rights*, available at <http://www.ccne-ethique.fr/docs/en/avis098.pdf>; OPINION N° 98; Paris: 2007.
- [39] Agamben G. *No to bio-political tattooing*. *Communication and Critical/Cultural Studies*. 2008; 5(2): p. 201–202.

- [40] Mesnard P, Kahan C. Giorgio Agamben à l'épreuve d'Auschwitz. Paris: Kimé; 2001.
- [41] UNESCO. Information for All Programme. 2007.
- [42] Amit. 12 Companies Leveraging Blockchain for Identification and Authentication. [Online]. 2016 [cited 2016 December 17]. Available from: <https://letstalkpayments.com/12-companies-leveraging-blockchain-for-identification-and-authentication>.
- [43] BITNATION. Bitnation Refugee Emergency Response (BRER). [Online]. 2016 [cited 2016 December 17]. Available from: <https://refugees.bitnation.co/>.
- [44] Allison J. Decentralised Government Project Bitnation Offers Refugees Blockchain IDs and Bitcoin Debit Cards. [Online]. 2016 [cited 2017 January 22]. Available from: <http://www.ibtimes.co.uk/decentralised-government-project-bitnation-offers-refugees-blockchain-ids-bitcoin-debit-cards-1526547>.