2 Identity of Identity

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Summary. The objective of this chapter is not to bring the answer to the ultimate question 'what is identity?', – an almost impossible undertaking given the complexity and the constant evolution of the subject – but rather to present, more like on a journey, different angles that can be used to define this concept, in particular in the context of the Information Society. Starting first at describing how this conceptualisation can be conducted in the traditional way of theorisation well known by the academics, this chapter then indicates how less formal approaches such as narratives can be used to help to understand the concept. It also introduces how the new 'social tools' originating from the Web 2.0 can be used to stir the intelligence of experts from different horizons so as to generated a meaningful and practical understanding of the subject. The second part of the chapter is used to illustrate how each of these approaches have been operationalised by presenting a series of models and scenarios presenting different perspectives and issues that are relevant to the subject, and a collaborative Web 2.0 knowledge infrastructure that was used in FIDIS to facilitate the conceptualisation of identity by a group of experts.

2.1 Defining the Identity Concept

Conceptualising identity represents a number of challenges originating from the complex and multidisciplinary nature of the subject (identity), a domain in constant evolution in which old concepts are being reinterpreted and new concepts are created, and which involve experts of different horizons and of different geographical location.

The traditional approach for this conceptualisation is well known and consists in asking experts to provide theories of the subject being under study. The experts typically reflect on the subject and produce generic models that can be applied in different situations. These experts then write academic papers and textbooks to document their findings and to make their knowledge available to a large audience. Another approach consists in identifying the *vocabulary* of the terms that are the more frequently used in the domain to describe the subject, and to define the semantics of each term and their relationships in a way that will have as little ambiguity as

possible. Practically, these definitions are to be found in *dictionaries* or *encyclopaedias*. Information system specialists have also invented some special languages and tools allowing more formal definition of the different terms and to connect them with one another. *Ontology*, *taxonomies, Unified modelling Language* (UML) diagrams, are created as a way to define the concept of a domain. This chapter, and more generally this book, presents several illustrations about how this conceptualisation was conducted in FIDIS to define the concept of identity.

Yet at the same time, the experience has demonstrated that this very explicit conceptualisation presents some flaws: a domain as complex as identity is not easily put into boxes, at least for some of its aspects. Firstly, identity is a concept that is constantly evolving. Also it is considered a moving target. By trying to formalise too early and too precisely some concepts, you take the risk that the meaning of these concepts becomes obsolete in the perspective of the new contexts, or that you overlook more important concepts that have emerged since. An example has been given recently with the Web 2.0 where the massive use of online social networking or of blogs has totally refined the concept of online identity. In the new setting, the identity of the person is blurred, being constructed from a multitude of sources that are more difficult to control, and this requires a novel approach to become manageable. Besides some people are more inclined than in the past to expose their selves towards the world so as to gain visibility, increase their social capital and flatter their narcissism. Another difficulty of this very explicit conceptualisation is that it creates barriers since it mostly relies on experts for its elaboration, and requires some effort in its exploitation. Creating theories is a complicated task, and absorbing these theories is not necessarily a pleasant experience for many. However, research in knowledge management has shown that alternative methods exist to codify knowledge and to diffuse knowledge that in some cases do not even need to be codified. Hence storytelling has proved a very effective technique to capture knowledge, to describe concepts and to diffuse it largely. Many people like to write stories, and even more people love to listen to them. In this chapter, we will explain how storytelling and more generally narratives (such as use cases and scenarios) can be effective in helping to clarify concepts, and how they have been used in FIDIS.

Finally this chapter will also present the opportunity to introduce new tools such as Wikis, blogs or social bookmarking that have emerged as part of the Web 2.0 and that can greatly contribute to support the conceptual process in its formal or informal form.

We hope in this chapter, to provide the epistemological perspective of how conceptualisation can be conducted to define the concepts of a complex domain, and how these principles have guided FIDIS in defining the identity concept.

2.1.1 The Multidisciplinary Challenge

Defining the concept of Identity represents a significant challenge: identity spans a variety of disciplines such as Security, Law, Technologies, Information Systems, Social Sciences, and Philosophy for which approaches and traditions for concep-

tualising a subject can vary considerably. For instance philosophers may be interested by very high level and abstract conceptualisations presenting a big picture relevant to humankind, whereas social scientists may care more about an analysis of the usages grounded in reality. Some lawyers may be more interested by very formal rules (the book of Law) describing precisely the meaning of all the elements intervening in a situation. Yet, lawyers also like at the same time (in particular common law[1] countries) to rely on more descriptive approaches based on cases presenting precedents of court decisions as a way of specifying the rules to be applied. Information system specialists may need very precise descriptions so that it can be implementable in machines. And security experts or technologists may feel more familiar with a process oriented perspective defining mechanisms.

Besides, all the different dimensions are increasingly interrelated, and no domain can afford to remain isolated in its knowledge silo, without taking the risk of affecting the effectiveness of the work (Sveiby and Simons, 2002). For instance technical or security experts have to be aware of the human dimension (people have emotions, are influenced by social norms (Kogut, 2008) and culture (Nisbett, 2003), are not always rational in their decisions (Ariely, 2008), and can be manipulated (Cialdini, 2001)), and take into account the effectiveness of social engineering 'techniques' for breaking into systems that appeared secured. Law specialists have to be informed about the pace of evolution of the technologies and of the current practices (e.g., the usage of the exchange of music files in peer to peer networks) so as to be able to address effectively novel forms of fraud and to defend people's privacy (ALRC, 2008), and information systems designers have to be aware of the privacy concerns raised by society and governments so as to elaborate socially acceptable solutions.

2.1.2 Identity: A Concept Subject to Major Evolutions

Identity is also a topic which is subject to constant evolution and reinterpretation, given the tremendous changes in the technologies that can completely transform and make obsolete a vision of reality. For example online systems have enabled the development of totally new forms of identities such as in the case of multiplayer online games (i.e., MMORPG) in which people can invent a new life, or with the case of blogs that a normal person can use as a personal 'stand' in which she is able to express their opinion, and even take the role of a journalist. Profiling technologies may radically transform the concept of identity by exposing some of the previously hidden part of the person by analysing the digital traces that people leave as part of their actions, or by exploiting and by cross-joining the content of huge databases.

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[1] *Common law* refers to law and the corresponding legal system developed through decisions of courts and similar tribunals, rather than through legislative statutes or executive action. Wikipedia. Countries having adopted 'common law' as the basis of the legal systems include in particular the Anglo-Saxon countries such as United Kingdom or the United States.

In the Digital Society, and in particular in the Social Web (implementing the vision of the Internet as a social space encouraging and supporting people participation), much more personal information is available: people can describe explicitly their identity using the profiles that are present in many systems such as social networking services (such as in Facebook or LinkedIn). They can also define more implicitly their identity by exposing their thoughts, beliefs and actions via a variety of tools (e.g., blogs, bulletin boards, micro-blogging) from which their identity can be inferred. The traces of their activities (referred to as digital traces) are even increasingly exported by the platforms thought RSS feeds[2], and these 'life streams' can be displayed into aggregators[3], or processed by machines. This personal information defined by the end user is also less reliable than in the off-line world since it is usually not controlled by a trusted authority that can enforce the validity of the information. For instance on the Internet, people have many opportunities to 'lie' with the reality. Thus, according to a study from Robert Epstein (2007), many people are lying in dating services: women tend to lie about their age and about their weight, and men are inclined to lie about the level of their income. The unreliability of information is however compensated by mechanisms such as recommender and reputation systems relying on social mechanisms such as trust building (Resnick and Zeckhauser, 2002).

The more traditional world is also impacted by this trend: For instance new Id cards incorporating biometric information or having RFID capabilities create new issues such as more important risks for the privacy and the dawn of a 'Big Brother' society. DNA databases are already a reality, and are now even present in the 'collective unconscious' of the society having been popularised by the many television series such as CSI (Crime Scene Investigation). In these series, the forensic experts frequently use databases such as CODIS (Combined DNA Index System) to track criminals by comparing DNA profiles electronically. Yet at the same time the large diffusion of mobile phones able to take pictures anytime and anywhere and the possibility to easily spread information on the Internet in personal blogs creates the conditions of transparency counterbalancing some of the risks attached to a too high level of surveillance: In a context where almost any person has become a potential journalist, the identity and the acts of the 'torturers' are largely known. In the physical world, the technical progress has impacted the concept of identity by augmenting the transparency.

Finally, on the horizon with the announce of an 'Ambient Intelligence' Society in which communication technology will become pervasive, identity will go through an even bigger transformation. This future is already happening with the case of Location Based Services (LBS) that are made available via mobile phones incorporating a GPS such as the latest Apple iPhone. These new mobile

[2] A RSS feed represents a list of items (each item consists of a title and a summary) that is provided in XML format, that is frequently updated, and that is used to exchange lists of summary information such as news.

[3] An aggregator is a component that is able to display in a single place several feeds of information.

services (see Chapter 5 for a presentation of these services) may not be as spectacular as the announcement of the transformation of humans into cyborgs[4] with people having RFID chips implanted in their body (see Chapter 4 for a discussion about High-tech systems), but they are very effective in popularising news usages given their level of adoption. If it is still difficult to predict the exact impact of these changes on people's life, we can imagine that, with the disappearing of the frontier between the offline and the online world, the new identity that will emerge will bring in the physical world many of the characteristics very present in the online worlds, such as increased transparency and massive tracking and profiling.

2.1.3 Addressing the Challenges

How do we reconcile all these perspectives originating from so many disciplines into something comprehensible by the normal person? How do we make people of different origins and cultural backgrounds work together in defining the multiples facets of the concept of Identity? How do we define precisely concepts that can constantly evolve without the risk of freezing definitions that can rapidly become obsolete?

First, it is important to note that the definition of a concept can be done in multiple manners that range from the very strict definitions of the concept as the one found in a dictionary, to the much less formal description such as narratives (such as stories or scenarios) illustrating how this concept is applied. In the first case, strict definitions will present the advantage of reducing ambiguity, whereas in the second case the use of the more 'lazy' approaches will allow the description of fuzzier concepts. Less formal methods may also present the advantage of being easier to elaborate (and in particular by the non specialist), and the result may be more digestible by the 'common mortal' (and not only by the expert).

Second, it is also important to create the conditions of good communication between the stakeholders involved in the conceptualisation process, in particular if they originate from different disciplines. These conditions facilitate and accelerate the finding of a common understanding and the reaching of a consensus by allowing the exchange and the confrontation of ideas and perspectives. Practically, a certain number of processes and tools can be used for this purpose such as meetings and brainstorming. More interestingly, the Internet and more particularly the so called Web 2.0[5] with services such as Wikis, blogs or social bookmarking systems, has made available a whole set of solutions allowing groups of communities to participate collaboratively on a subject.

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[4] Cyborg is a term that was coined by Clynes and Kline (1960) for defining an organism having both a synthetic and an organic part.

[5] Web 2.0. is a term that was first coined in 2003 at a conference brainstorming session between Tim O'Reilly and Dermot A. McCormack as a means to indicate a completely new revival of the Web along new concepts such as the importance of the social dimension, the creation of a rich user experience, and an architecture of participation (O'Reilly, 2005).

This book chapter will show how the FIDIS project has tried to address this complexity challenge by adopting these principles and tools that we have mentioned to define the concept of identity. It will also provide an extract of the outputs that has resulted from this work.

2.1.4 Structure of This Chapter

Section 2.2 presents the different approaches (formal and less formal) that can be used or have been used in FIDIS to help the conceptualisation process in particular in the context of a domain that is very multidisciplinary and in constant evolution, and favouring the participation of many participants of the FIDIS network. It also describes the Web 2.0 knowledge infrastructures that can be put in place to support the conceptualisation process. Section 2.3 describes the more explicit approaches of this conceptualisation via the definition of terms and the inventory of the profiles of the person in different systems. Section 2.3 also indicates systems and processes that have been used for this conceptualisation such as Wikis. Section 2.4 is about a more descriptive approach of this conceptualisation via the provision of use cases, stories and scenarios allowing understanding more concretely these concepts. Section 2.5 will briefly present how FIDIS have tried to make use of the new participative tools such as Wikis or blogs that have emerged as part of the Web 2.0. Section 2.6 concludes this chapter.

2.2 Conceptualisation

> *If you put three Lawyers together in a room, you'll end up with four different opinions*[6]

Defining the meaning of a subject such as identity represents a difficult endeavour: firstly because the subject can be vast and complex, and span a variety of concepts and disciplines. Secondly because the domain may not be mature and be subject to constant evolution: how do we describe a domain that constantly changes without taking the risk of becoming rapidly obsolete? Thirdly because some of the concepts are inherently difficult to define or are by essence blurry. Modelling concepts involving human factors for example usually represent a difficult undertaking: the human nature is complex, and cannot easily be put into boxes. Besides some terms used in the language are definitively vague, since their function is not so much to convey meaning but to facilitate communication. This is the case with boundary objects (Star and Griesemer, 1989) that are known to have different interpretations in different communities, but that are useful for the forming of a shared understanding. This limitation of the language is even more profound, and has epistemological roots: objective recognition of an existing

[6] Note: Similar jokes also exist for economists, scientists, theologists, etc., for illustrating the difficulties for a group of persons to converge to a shared opinion on a subject.

world is impossible due to limitations of cognition and communication (Holten, 2007). Also, at least in some cases, the result of some conceptualisation has to be accessible to a large enough audience: what is the point of having a 'perfect' conceptualisation if it is only manageable by a very small group of specialist. Finally, and as illustrated in the previous joke about Lawyers, reaching an agreement between different people is often difficult, since each person relates to a different experience of the world, and often has a different set of priorities.

Yet at the same time, supporting this conceptualisation process can be done in a variety of manners, and in particular does not need to rely only on very formal approaches. For instance, narratives (use cases, stories and scenarios) represent a more descriptive approach that can be used to expose a concept and reflect on the different issues in a way that can be very effective. Besides, structures can also be put in place and tools can be used, to facilitate the emergence and the diffusion of a common understanding of a domain in a community.

The aim of this section is to present the different approaches that can be used for the conceptualisation of a topic, starting from the more formal approaches, such as the elaboration of definitions in a dictionary, and continuing with the less formal ones consisting of the use of narratives for the description of concepts. It also reflects for each of these approaches what are the advantages and the limitations. This section also indicates how different collaborative tools, such as Wikis, blogs or social bookmarking that have recently appeared as part of the Web 2.0, can be effectively used for supporting a participatory conceptualisation process amongst a group of people.

2.2.1 Formal *versus* Informal Conceptualisation

Both formal and informal conceptualisation should be considered as useful since they serve a different purpose. Formal conceptualisation is useful for the elicitation of concepts that are stable and already well established. More informal conceptualisation is more adapted in the case of the concepts that are still subject to important evolution. Informal conceptualisation should also be used to illustrate concepts in general in a way that is more comprehensible and more attractive.

It should be noted that this discussion related to the level of formalisation is not new, and exists in one form or another in other domains such as knowledge management, education or Law. Hence the idea of making the knowledge explicit was at the heart of the first knowledge management models which put a particular strong emphasis on knowledge externalisation, i.e., in creating processes making the tacit knowledge to become explicit. More recent approaches of Knowledge Management (KM), acknowledging the disappointing outcomes of these approaches, are incorporating processes taking into account both the tacit and the explicit. Thus the SECI (Socialisation, Externalisation, Combination, Internalisation) model of Nonaka and Takeushi (1995) proposes a number of knowledge processes articulating the explicit and the tacit, and the modern approach of knowledge management, also termed as Enterprise 2.0 'do not focus on capturing knowledge itself, but rather on the practices and outputs of the knowledge worker' (McAfee, 2006).

Another example can be found in education related to the method used to teach people about a subject, and that can include both very didactic methods and more informal methods. This is the case in management education with the Case method (Hamond, 1976) which consists of putting students in situations presented in a narrative mode and asking them for a solution, and that is frequently used as a teaching method that departs from the explicit exposure of a theory: In the Case method, people assimilate knowledge by experimenting rather than by 'absorbing' theories.

Finally, it should be noted that Law (and Theology) also includes both the formal and informal dimensions with the distinction between statuary law and common (or decision) law: In the first case, a strict and precise codification in the Code of Law describes concepts and rules that help to categorise lawful or unlawful actions; In the second case description of cases and discussions presenting precedents are used for governing future court decisions (or in religion to provide some interpretation to the 'Books of Law').

2.2.2 Formal (or Explicit) Conceptualisation

Formal conceptualisation refers to a very explicit definition of concepts aiming at defining precisely a subject so as to facilitate the unambiguous understanding of that subject and facilitate the communication between different actors, and in particular the reaching of a shared understanding and the construction of a common ground (Clark and Brennan, 1991). Concepts and terms that are frequently associated with formal conceptualisation include categorisation, classification, taxonomies, ontology, dictionary, encyclopaedia, models or theories. It should however be noted that no general agreement exists about what is a *conceptualisation*, Bjelland (2005) mentioning that there is even a disagreement in the nature of *classification*.

An important function of very explicit and formal conceptualisations is to offer a precise vocabulary facilitating the good comprehension of the domain and a good communication between two or more actors. Thus a study reported in Bjelland (2005) suggests that classification may contribute to a shared understanding of basic modelling concepts. A good conceptualisation will in particular reduce ambiguity to a minimum and guarantee that the interpretation of a concept is the same for everyone, and therefore helps in the establishment of a common ground.

More concretely, explicit conceptualisation of a domain consists of different elements such as: (1) the identification of a vocabulary of terms to be employed to define the domain; (2) the classification of this vocabulary of terms into categories (often referred to as taxonomy); (3) the precise definition of the semantic of each of the terms. The definition of the semantics consists in the statement of the meaning that is done using sentences in natural language, but it can also be done by specifying the relationships of this term with other terms or concepts. Typical examples of explicit conceptualisations include dictionaries and encyclopaedias. Formal conceptualisation is also an important field in knowledge management (Andrade et al., 2008).

The Specification of Conceptualisation in History

The explicit specification of concepts can barely be considered as something new, since it is a topic that was already explored back in Greek antiquity by philosophers. For instance, in his text 'Categories' written in 350 B.C., Aristotle introduces categorisation as an attempt to articulate the different objects and actions, and helping to define meaning univocally (such as explaining the concepts of synonymy or homonymy). Greek philosophers invented the term Ontology that they defined as the branch of metaphysics relating to the nature and relations of being. At this time this conceptualisation was mainly done through writing and discourse. Since then, Ontology has at various times received the attention of philosophers.[7]

Then in the Middle-Age and later at the Renaissance, people have began to more systematically and explicitly specify the conceptualisation of a domain by using dictionaries and encyclopaedias (the first reference to the term dictionary can be traced in the 13th Century[8], and the modern encyclopaedia can be dated to the beginning of the 16th Century). Dictionaries and encyclopaedias represent a way of specifying a conceptualisation that is based on definition, in alphabetical order, of the terms or words of a domain (dictionary), or on the subjects of a domain (encyclopaedia).

In the 19th Century, classification played a key role in Natural Science, and one can cite the work related to the classification of species of Lamarck, Buffon and Darwin that played a considerable influence in this area (and is at the root of genetics). Classification relies on the idea of conceptualising a domain based on the identification of a set of characteristics that can be owned by an object and that is usually hierarchically structured (examples of classification: the library classification of subjects[9]; or the classification of species in biology).

Computer Science has shown an early interest in the very explicit specification of concepts. The aim was at making the specification of concepts comprehensible by machines. Hence, as a necessary condition for conducting automatic operations and reasoning, Artificial Intelligence started early trying to define explicit and formal specifications of knowledge (Aiii, 2004): Examples include Allen Newell's research on symbolic computation in the mid 50's then Ted Nelson's invention of Hypertext in the 60's, then Marvin Minsky with the introduction of the concept of Frames in the 70's, and later Douglas Lenat with his work on the Cyc framework aiming at representing common sense in the 80's.

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7 See 'Ontology: A resource guide for philosophers', by Raul Corazzon. http://www.formalontology.it/.

8 The first recorded use of the term 'dictionary' to mean 'word list' can be associated with the 13th-century Dictionarius of John of Garland; the first edition of the Webster dictionary of the English language was launched in 1806.

9 For instance the Dewey Decimal Classification (DDC) system or the Library of Congress Classification (LCC) provides a dynamic taxonomical structure for the organisation of library collections. Note: These classifications should be distinguished from other classification in library such as the Dublin Core (http://dublincore.org/), which aim at defining the structure of the objects (books, authors, etc.) that are dealt with in a library.

More recently with the advent of the Internet, the Computer Sciences field has generated a lot of activities around the concept of the Semantic Web (Berners-Lee et al., 2001) which relies on strong semantic representation of data that is aimed at facilitating the exploitation of this data by machines. In this context Ontology work consists mainly on the idea of conceptualising a domain in term of objects and semantic relationships. This trend towards the semantic web, which has dynamised research in how to represent the elements of a domain with a maximum depth, has however proved to be cumbersome, since difficult to create and maintain. More recent approaches such as folksonomies (an open classification emerging from the participation of a community (Mathes, 2004)) are moving away from the strict interpretation of these concepts in favour of a less rigid and more emergent approach.

On a parallel track, knowledge construction and categorisation has flourished, and new approaches have been invented such as combination hyper-textual and collaborative knowledge construction which is best exemplified by Wiki systems (Cunningham and Leuf, 2001), a system in which every member of a community can participate in the creation of the content of an encyclopaedia.

Advantages and Disadvantages of Explicit Conceptualisation

As indicated previously, very formal definition of terms in a dictionary presents the advantage of reducing the level of ambiguity to a minimum, and therefore reduces the risk of misinterpretation of the meaning. As a consequence, explicit conceptualisation facilitates the communication process inside a community by contributing to making people speak the same language, and with some guarantee that each term will have the same meaning (Clark and Brennan, 1991). Another advantage of a formal definition is generally its depth and completeness: authors of definitions have often made a lot of effort to guarantee the good articulation of different concepts, and to have explored the many dimensions related to this concept. For instance, the reader of a dictionary is expected to find related to a given term all the different meanings associated to that term. Finally the processes of abstraction that is conducted as part of the formalisation of the concept, which often consist of extracting the knowledge from its original context, contributes to the generality of the result and its applicability in a variety of contexts. This very 'solid' level conceptualisation is actually very much consistent with the scientific method, which aims at producing precise models, the application of which is guaranteed to generate replicable results.

Yet, very explicit conceptualisation is not without some limitations for the elaboration of these concepts, but also for how these concepts are used later. More specifically defining rigorously concepts can be difficult and lengthy in particular when the meanings of these concepts have not yet stabilised and when the definition of these concepts involves different participants. It can also be made difficult since it requires a high level of expertise from the participants of the conceptualisation and a good level of coordination. It is not rare that the conceptualisation process can create incomprehension and even tensions between different stake-

holders of different disciplines, since the same term can have a different meaning in the different disciplines, and the same concept may be expressed using different terms depending on the discipline.

Besides, the result of a conceptualisation may also sometime appear to be somewhat complex and 'esoteric' (i.e., very detached from the reality) and be difficult to apply except for the experts. In particular, the result may also become sometimes difficult to comprehend by the non expert of the domain, since it can conduce to a high level of abstraction originating from the aspiration of creating something as generic as possible, or being obfuscated by details aimed at removing ambiguity. Finally, too 'perfect' conceptualisation may not be the most appropriate medium in the perspective of a dissemination purpose (e.g., for educating people about some concepts) since it may appear tedious (few people enjoy reading a dictionary), and not prone to facilitating serendipitous discovery.

Ironically, the 'conceptualisation of conceptualisation' itself, i.e. the definition of the domain of conceptualising 'things' is relatively confused, and the associated terms are subject to multiple interpretations and are the object of controversy. Thus the definition of the term Ontology is diverse, and is used in a different manner in different domains[10].

Interestingly, explicit conceptualisation methods are evolving with the objective of overcoming some of these limitations such as their rigidity. For instance the term folksonomy which was created in 2004 as the concatenation of the terms folks and taxonomy, represents a vocabulary of terms used by a community, and that originates from an emergent process involving the participation of all the members of the community in the identification of the terms generally used by that community.

2.2.3 Informal Conceptualisation with Narratives

Formal and precise descriptions of concepts as can be found in dictionaries are not the only approach that can be adopted to describe a concept. It is also not always the most desirable.

Narratives (such as cases, stories and scenarios) represent an alternative approach that can be used to define concepts. Narratives rely on the idea of exposing the audience to the subject in a relatively informal way, in a context well connected to a concrete situation making sense to the audience (note that this situation can be fictional or non-fictional). A narrative favours a very descriptive presentation of situations in contrast of the in-depth and very high level conceptualisation.

Narratives may not appear as the most 'rigorous' way to describe concepts, and in particular do not have the same depth as the more formal approaches. They present however a certain number of advantages such as their ability to help to understand concepts that are blurry (because they are very recent or they are by their nature very complex) and / or that resist a formal conceptualisation. Narra-

[10] See for instance the definition of Ontology that is given by Gruber (2008).

tives also contribute to people coordination: Thomas, Kellogg, and Erickson (2001) thus indicate that 'stories can serve not only to support communities of practice with a common vocabulary; they can also serve an important coordinating role within a team'.

Thus, the use of narratives has been the subject of numerous researches in the field of knowledge management as a very effective means to propagate (McLellan, 2002), to elicit (Snowden, 2002), to capture, and to exchange complex ideas, and also to encourage collaboration, to generate new ideas and to ignite change (Denning, 2001; Lelic, 2002). In organisations in particular, Sole and Wilson (2002) indicate that storytelling has been identified as a means to: share norms and values; develop trust and commitment; share tacit knowledge; facilitate unlearning; and generate emotional connection.

Power and Limitations of Narratives to Describe Concepts

The narratives present a number of advantages both for elicitating concepts (Snowden, 2002), and for diffusing these concepts (McLellan, 2002). First, narratives are often easier to elaborate than theoretical construction, facilitating the process of collecting the knowledge related to a subject: one does not need to be an expert to write a story or to describe a case. The writing of a narrative also does not require the same level of reflection and time as the more formal approach since they do not pretend to be as rigorous as the more formal methods. They may also be more pleasant to write, engaging, stimulating the imagination and authorise the expression of ideas that are at odds with the current organisational common beliefs (Snowdon, 2001).

Narratives are also usually more comprehensible, facilitating the diffusion of concepts to a larger part of the population. Indeed, narratives can be more entertaining (less boring) both for the author of the narrative and for the audience, and subsequently, they are more accessible: most people understand and enjoy reading or listening to stories, whereas many people have some difficulties in keeping concentrated in very theoretical descriptions. Finally, narratives can have a more important impact, since they are more grounded to reality and concrete situations that people may have experienced in their real life.

Narratives appear very adapted to describe concepts that are by essence very blurry, or concepts that are very new and that have not yet gone through a maturation phase.

Of course, the use of narratives is also not a panacea, and actually it does not pretend to be a substitute for the more formal approaches. Narratives lack the rigour and the coverage of more formal methods, and in particular fail to provide an in-depth knowledge of the subject, and their application can be limited to the context, which is presented. Narratives may also be more ambiguous, and are more subject to multiple interpretations.

2.2.4 Web 2.0 & Conceptualisation with Wikis, Blogs, Social Bookmarking and Other Tools

> *Meanwhile, the poor Babel fish, by effectively removing all barriers to communication between different races and cultures, has caused more and bloodier wars than anything else in the history of creation.*[11]
>
> Adams, 1979

The conceptualisation of a subject should also be considered in the perspective of the different processes contributing to a good conceptualisation and on its diffusion, and not only on the visible results of this conceptualisation (such as textual definitions or narratives). This conceptualisation can bring a less visible result such as the better awareness of the subject being conceptualised, or motivating conditions keeping this conceptualisation up-to-date also represent tangible values. Practically, processes contributing to contextualisation can result in the setting-up of the conditions for good communication and coordination between the different stakeholders participating in the conceptualisation as well as the diffusion of the concepts. The objective is to facilitate the creation or the reaching of a common understanding accommodating the different perspectives and resulting from the interaction between the different actors, the confrontation of ideas and perspectives, and the forming of a consensus. The objective is also to support the participatory elaboration of the different concepts both for the formal and the informal definition of the concepts.

A number of processes and mechanisms can be made available to support a community in defining formally or more informally a set of concepts such as review and quality controls, committees or more informal discussions. More interestingly, the Internet, and more particularly the Web 2.0, has come with a whole set of solutions allowing groups and communities to participate collaboratively on a subject such as Wikis, blogging or social bookmarking. Each of these tools, often referred to using the term social media, contributes in its manner in the elaboration of definitions, in the exposition of situations or in the emergence of a common understanding in the community. In the next paragraphs, we will provide a brief survey of these new tools and indicate for each of them how they can contribute to the conceptualisation process.

Wikis

Wikis represent the most obvious tool for supporting the contextualisation process. A Wiki is a set of linked Web pages created through incremental development by a group of collaborating users as well as the software used to manage the set of

[11] Douglas Adams' 'The Hitchhiker's Guide to the Galaxy' (Pan Books, London, 1979) is a famous science fiction comedy series and a novel which addresses cultural differences in a humorous way.

Web pages (Wagner, 2006). Practically a Wiki can be used to collaboratively conceptualise a domain, each of the pages corresponding to a particular term or concept to which everyone can participate. An important characteristic of Wikis is related to the open, very iterative, and quick post-approval process (changes are immediately effective, and errors are corrected afterwards) making the evolution of the content very dynamic and involving a large number of participants. This collaborative dimension is real and has proved to be effective, the 'edits correspond on average to an increase in article quality' and the quality of the articles is correlated to the number of distinct editors (Wilkinson and Huberman, 2008). Rafaeli and Ariel (2008) indicate in their research of Wikipedia[12], the most popular Wiki that is on the top 10 of the most visited web sites on the Internet, that Wikipedia is able to mobilise a high level of participation that makes it work in practice.

Yet Wikis are not without limitations such as the accuracy of their content, and the various level of participation of the authors contributing to their content. The reliability of information in a Wiki has been questioned (Lih, 2004) in particular related to Wikipedia and the possibility for everyone becoming an author. Tumlin et al. (2007) have also pointed out the risk of this category of system to shut down divergent thinking. However empirical studies do not seem to support the assertion of lack of reliability of Wikipedia (Chesney, 2006). Concerning participation in the case of Wikipedia, the proportion of lurkers (users that access the system but that never contribute) is very important since the number of more than 75,000 active contributors has to be compared with a number of unique visitors of about 50 million per month as of year 2008[13]. The question of motivation for participation by scholars in Wikis or other open collaboration systems also appears to represent a real challenge: Academics indeed get promoted via their publications that go through a strict review process; they therefore have little incentive to publish their work in the open. Besides, the possibility for anyone to update any content in a Wiki and the anonymity and the nature of the 'correctors' (self-proclaimed experts that are usually non academics and even students) put them in the situation in which their contribution can be challenged and modified, a situation of lack of control they may not feel comfortable with.

Blogs

Blogs represents another method that can be used to support the conceptualisation process. Personal blogs in particular offer the possibility for their authors to expose their beliefs and opinions (Nardi et al., 2004) using chronologically ordered short and informal texts from which the visitors can easily provide feedbacks. Besides, the mechanism of trackbacks allows the author of a posting when referencing another post, to automatically generate a bidirectional link between the two posts, allowing the creation of a web of links between related postings, contribut-

[12] Wikipedia: www.wikipedia.org/.

[13] Statistics provided by Wikipedia at : http://en.wikipedia.org/wiki/Wikipedia:About.

ing to relaying ideas and opinions in the blogosphere (a term meaning the space comprising all the blogs). This blogosphere can in particular be observed to identify trends in a domain (Klamma et al., 2007).

The nature of the content posted on a blog can be associated to short narratives, and represents a form that can be particular adapted for identifying issues, and in particular can be very useful in relaying news on the subject and adding comments (opinion and perspectives) on this news. Hence, in the domain of identity, a blog posting may relay the announcement of the stealing of a database of social security numbers, and may raise the issue of the increased risk associated with the disclosure of personal information in the Information Society. Comments on this post may indicate other data thefts, and for instance, add that 'no data is safe' when it is on the Internet. Other postings may just aim at sending a message to the blogosphere (i.e., as was done for communicating about the Budapest declaration[14]) so as to raise the attention of the community, and get some reaction from the Internet community.

If the advantages of blogging are undeniable, in particular by providing the way for a community to easily provide informal input helping to raise the attention of a community of the important issues, or at contributing to the emergence of new ideas, it has also many limitations. First, the knowledge collected may look shallow and unstructured, giving only a parcelised and diffused view of a domain, making it difficult to get the global picture of a topic. Second, its dominant usage may be in the relaying or information rather than the creation of new knowledge. Also, but this is the case of most collaborative systems, blogging raises the question of motivational issues: blogging, and more generally using social media, is a time consuming activity for reading and even more for contributing (Perez, 2008). Finally, the seeking of truth should be the driver for determining the scientific knowledge and not the conforming to the public opinion (the wisdom of the crowd).

Social Bookmarking and Tagging

Social bookmarking or collaborative tagging provides an extremely simple, distributed, not disruptive but powerful way for a community of people to share bookmarks of internet resources. Practically, a social bookmarking system (Hammond et al., 2005) such as del.icio.us[15] often takes the form of an Internet browser extension (plugin) allowing a user to bookmark an Internet site, and to associate keywords or tags. The bookmarks are recorded in a central server and made available to the whole community (Marlow et al., 2006; Golder and Huberman, 2006; Halpin et al., 2006; Naamann, 2006; Millen et al., 2005). When connecting to the

[14] The Budapest Declaration on Machine Readable Travel Documents is a Public declaration that was issued by FIDIS in September 2006 to raise the concern to the public to the risks associated by a security architecture related to the management of Machine Readable Travel Documents (MRTDs), and its current implementation in the European passport that creates some threats related to identity theft, and privacy.

[15] Del.icio.us http://delicious.com/.

social bookmarking server, an individual user is able to access his / her personal bookmarks, as well as the bookmarks from the whole community in a chronological manner, or via the different tags. This collection and categorisation of resources can also be done via specialised social bookmarking services aimed at organising academic papers such as CiteULike[16] or Connotea[17]. Finally, social tagging mechanisms are often present in many social media services such as Flickr[18] (photo sharing), YouTube[19] (video sharing), SlideShare[20] (Slides sharing) and blogs.

In the context of conceptualisation, social tagging can be used to annotate content (bookmarks, academic references, Medias) in a participatory way, i.e., to associate keywords or tags to this content, and also to collect resources that are relevant to a domain in a community. It can also help to identify the terms (the tags) that are the most frequently used in a community of users, and to raise the attention of these communities about the topics (terms) that are the more popular in that community. Tagging also improves the quality of information retrieval.

As for blogging, social bookmarking represents only a tool that enhances a participatory conceptualisation process, and does not pretend to conceptualise explicitly a domain. Yet, the process of tagging can be associated with a categorisation of the content making use of folksonomy (an emerging categorisation originating by the community of the users), and therefore contribute more to the elicitation of the knowledge than in the case of blogging. Besides, this categorisation can also be associated with the emergence and the adoption of a vocabulary of terms (the tags) by the community: the members by being aware of the more popular tags will be inclined to use the same tags, and therefore the same vocabulary to communicate. Again as in the case of other participatory mechanisms, the adoption of tagging practices is dependant upon the motivation of the participants. However, the cost of tagging content in social bookmaking services is usually very low, and more importantly tagging benefits the user at the individual level: people tag to organise their knowledge, and this work is made available to others without additional cost (Naaman, 2006). Tagging has also some limitations in terms of efficiency in the information retrieval process, related to the difficulty of determining the most adequate level of specificity of the tags to use to annotate a set of resources (Chi and Mytkowicz, 2008). Besides, the quality of tagging varies widely 'from tags that capture a key dimension of an entity to those that are profane, useless, or unintelligible' (Sen et al., 2007).

[16] CiteULike. http://www.citeulike.org/.
[17] Connotea. http://www.connotea.org/.
[18] Flickr http://www.flickr.com/.
[19] YouTube http://www.youtube.com/.
[20] SlideShare http://www.slideshare.net/.

Other Tools (Social Networking,Virtual Worlds, Information Aggregators, etc.)

The Web 2.0 has also proposed a variety of other mechanisms and tools that can be used to support the collaboration process in a community and that can therefore contribute to a participatory conceptualisation process. Social networking systems (Boyd and Ellison, 2007) such as Facebook[21], LinkedIn[22] or Ning[23] can be used to support the creation of social structures (such as groups or social networks) and the diffusion of social awareness (via the activity streams that these systems make available) contributing to the creation of trust, common culture, and therefore facilitating collaboration in particular with people weakly connected (Granovetter, 1973; Brzozowski, Hogg and Szabo, 2008). Virtual worlds (Mennecke et al., 2008) such as Second Life[24] represent another category of system that can be used to support the collaboration of a community by offering the possibility to their members to interact in 3D digital spaces, each member appearing to the others via avatars. Virtual worlds may also be used to simulate a situation. Thus in the case of the identity concept, a virtual world could be used to create games in which the participants could experiment with some issues such as testing the usage related to the control of an identity card at a check point, or how to develop a totally new digital identity.

Information aggregators like Netvibes[25] allow syndicating streams of content available as RSS feeds that other web sites have published (Gill, 2005). The categories of this content are very large and can include news headline, but also a variety of other things that Web 2.0 systems (blogs, Wiki, social tagging, social networking, etc.) generally export. These aggregators therefore allow collecting in a single place the many categories of activities related to the conceptualisation process in a community such as news headlines, latest changes in the Wikis, latest posts in the blogs, last items tagged with a particular keyword relevant to this domain, streams of activities in a social network, life streams, etc.

2.3 Identity of Identity Defined (Formal Conceptualisation)

In the previous section, we showed that conceptualisation of knowledge could be done in a formal or an informal manner. In this section will look at applying formal conceptualisation for defining the identity concept.

[21] Facebook http://www.facebook.com/.
[22] LinkedIn http://www.linkedin.com/.
[23] Ning http://www.ning.com/.
[24] Second Life http://www.secondlife.com/.
[25] NetVibes http://www.netvibes.com/.

2.3.1 The Concepts of Identity and Identification

This part is based on some work[26] that was conducted as part of FIDIS to understand how the concept of identity is perceived by identity experts. In this work it was observed that experts approach the concept of identity according to one of the following perspective:

1. **A structural perspective: Identity as a representation.** *Identity* is seen as a set of attributes characterising the person.
2. **A process perspective: Identity for identification.** *Identity* is considered according to a set of processes relating to disclosure of information about the person and usage of this information.

These two perspectives should be considered as complementary: a broader model consists in viewing the concept of identity in the perspective of persons defined by a set of characteristics (the personal information), and involved in a series of processes making use of this information. More specifically, this personal information is used to authenticate a person, to grant authorisation, and also to support the actions of this person (such as when this information is used to personalise the interaction). Yet each category of expert perceives the concept of identity according to a very different vision leading to a different focus.

Experts in the first category are interested in understanding the different facets of the person, as well as concepts such as partial identity, and how it can be applied in different contexts. For these experts, identity is used to refer to a set of attributes (permanent or temporary) describing the characteristics of the person in the context of practical activities. In the case of a working context, these attributes may relate to the competency of a person and the function of the person in the organisation (such as the position), and intervene in a scenario in which competency represents an important factor of success in the accomplishment of a goal.

The experts in the second category are more interested by identity in the perspective of disclosure of the information for identification purposes so as to define the boundaries of people's actions. For these experts, identity refers to the elements that can be used to identify the person and to link her to some authorisation, and for which a good illustration is the Id card. The elements that may intervene in this identity include the name of a person, her position in the organisation, photograph, fingerprints, genetic characteristics and even behavioural patterns. In the case of the working context, this identity may be used in the identification process to grant a person access to a resource (such as a building or an information system) or give her the right to execute a transaction (such as signing a contract).

Another distinction between two concepts of identity has been advanced in philosophy by Paul Ricoeur with the concepts of ipse-identity and idem-identity (Hildebrandt, 2006; Ricoeur, 1992). The ipse-identity refers to the identity of a

[26] A more complete presentation of this work is available in (Nabeth and Hildebrand, 2005).

living person representing who the person really is (from a philosophical point of view). It is fundamentally fluid and indeterminate, and is out of the reach of the information and identification technologies. The idem-identity refers to the reductive characterisation of a person. It is static even if it is regularly upgraded, and is the only one explicitly formalised and manipulated by information and identification technologies. We will not try to draw a parallel between the structural perspective / process perspective and the ipse-identity / idem-identity, although it would probably make sense. We will only use this latter example of conceptualisation of identity to point out its complex nature, and in particular the existence of very different perspectives of this concept.

The Multiple Facets of Identity

Identity is not a topic only reserved to a small group of specialists. It intervenes very concretely in many facets of people's lives: their geographical mobility (dealing with the crossing of territories); their private life (dealing with their hobbies, romance, etc.); their family life (dealing with their marital status, their family structure); their social life (dealing with their friends, and their affiliation to groups); their work life (dealing with role, position, responsibility) and the way they conduct busi-

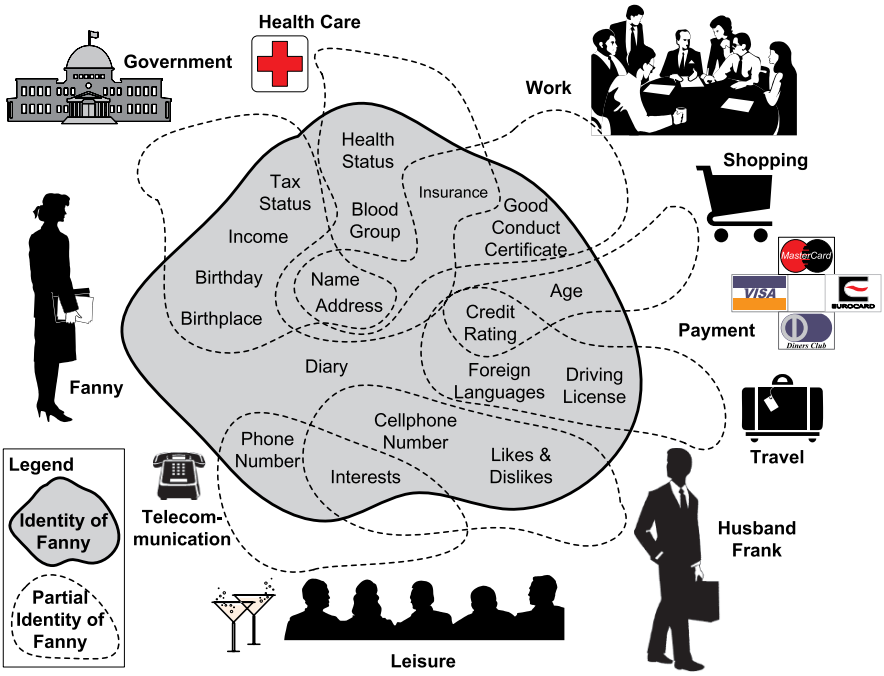

Fig. 2.1. Schema: Fanny's partial identities (Clauß and Köhntopp, 2001), with the permission of Marit Hansen

ness activities (dealing with contracting, reputation, …); their life as a citizen (dealing with voting, and participation in communal life); their biological life (dealing with healthcare); their life as a customer (dealing with transaction); etc. Figure 2.1 helps to illustrate this multiple nature.

In practice, in each of these different portions of life, identity and identification issues can occur, and take different forms.

First, identity and identification issues can relate to the legitimacy of acting because of the affiliation to a particular group (country, company, social group) or given the prerogatives (authority, right, etc.) attached to a particular accreditation (role in an organisation, diploma, recognised competence, bank account, etc.). Hence citizenship can give you access to some social benefits or the right to travel and work in another country; a diploma or other such proof of competence can allow you to apply for a job position and later to exercise this profession; friendship opens up the possibility of asking for 'and obtaining' free service from another person (the friend). Consequently, as individuals take on many different roles in the course of their life, different sets of characteristics, corresponding to these different roles, are used to represent their identity. Each of these 'partial identities' includes both inherited 'timeless' characteristics (such as nationality, gender, etc.) and characteristics that they have acquired during their life (such as diplomas, competences, etc.), or that they have been assigned or issued to fulfil this role (such as a position, some sort of authority, etc.).

Another dimension is related to effectively proving (with different levels of reliability) that a person has indeed the affiliation or accreditation that they claim and that is required for the action. Examples of such elements can include an ID (passport, or business card), a key (proving to a technical infrastructure the right to access), a 'parchment' (diploma), a social or competency clue (reflected in the attire or in the conversation), or a recommendation (originating from an acquaintance).

Other aspects are related to the (partial) access of this identity information by others, their usage of this information and the question of the control (see Claessens et al. (2003) for some discussions on anonymity control). The management of access to the information and of the control (by the person, by institutional bodies, by organisations, or by commercial entities) is critical since it relates to the liberty of action of a person. Thus the disclosure of information about the political opinion of a person (this person can be an activist or a Unionist) can seriously impact on the degrees of liberty of action of that person (in 'the worst case' the person may be sent to prison, in other cases it may put the continued employment of that person in jeopardy). In particular, making the information too transparent can cause people to not act at all for fear of retaliation (from other people, from groups or from society). This can have negative consequences (people may fear denouncing unacceptable situations) or positive ones (preventing people from hiding revenues and paying less taxes or making people liable for a damage for which they are responsible). A more mundane aspect relates to the shameless exploitation of this information by third parties who consider it as a public resource. Spamming (direct marketing of mass emailing) represents one of the most irritating consequences of this.

2.3.2 (Self-)Identity Concepts. Some Models

The notion of Identity is related to the characterisation and representation of a person (physical or moral) or of a group, and is concerned with the structure of this characterisation. For instance, Identity can be categorised according to different facets such as the personal Identity (personal), the biologic Identity (DNA), social Identity (membership), or the legal Identity and articulates them with their usage in different situations (such as leisure activities, transactions, work or social interaction). The concept of Identity can be applied to a physical, a moral or an abstract person (such as an organisation or group). Notably, many different possible categorisations of identity information exist.

The I, the Implicit Me, and the Explicit Me

Without having to go too deep into the psychological realm, it may be useful to make a rudimentary distinction between:

- *The I:* the indeterminate first person perspective
- *The implicit me:* how a person perceives herself
- *The explicit me:* how this person is perceived and represented (what is the image that this person provides to her environment).

These aspects establish the link between the living person, and her relationship to the external environment (the explicit me), the two being modulated by the (un)conscious perceptions a person has of herself (the implicit me) (Rost, 2003).

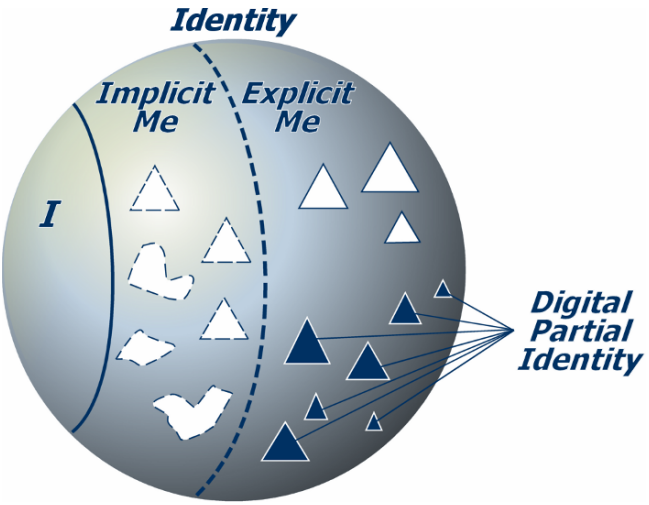

Fig. 2.2. The I, the Implicit Me and the Explicit Me (schema from (ICPP, 2003), with the permission of Marit Hansen)

This categorisation is important because it helps to raise and address two issues:

Acknowledging and addressing the Imperfection of the representation: Firstly it demonstrates that the access and representation of a person is only imperfect (incorrect) and partial since it is always a reduction of the person to objectifiable attributes. As mentioned before, much care should be taken to acknowledge this. Indeed, conflicts and problems typically arise in the case of dissonance between the way a person perceives herself to be and the identity attributed to her. In real world situations, addressing this issue does not always mean just questioning the correctness of the information and providing some mechanisms for assessment, adjustment and correction, but also acknowledging that the objectified identity is never congruent with the living person. As to the correction of redundant or false information, European law imposes holders of personal information databases to explicitly provide some mechanisms allowing a person to rectify incorrect information.

The question of the Control: The second issue is related to the control of this information: a person really only controls a limited part of her identity information. A large part of this information is externally controlled: by governments or institutions, such as the tax office, the healthcare organisations, by companies, e.g., by the company employing this individual or by her bank; by commercial entities, such as marketing firms; or by 'public opinion', such as newspapers or informal networks. Finding better ways to restrict an external entity from storing, manipulating and exploiting personal information may help address this issue. Some mechanisms (legal, technical, etc.) can be used to enforce good practices when an entity (governmental, commercial, …) manages personal information, such as defining what kind of information a certain category of entity is entitled to store, what kind of operation can be conducted on the personal data file, and how this information can be exploited. For example, companies may be forbidden to store medical information, the police may be forbidden to access medical information and the commerce of some customer lists may not be allowed. Diverse (legal, technical, educational, etc.) mechanisms (or a combination of mechanisms) could be used for this purpose. In the domain of law, it is important to note that the US and Europe have adopted different approaches on this issue, the US leaving the regulation of such matters, to a large extent, to private business enterprises (developing codes of conduct, good practices etc.), while Europe has tried to legislate on this issue (Agre and Rotenberg, 2001; Lessig, 1999).

True Identity, Assigned Identity, Abstracted Identity

A second categorisation of identity is as presented in the Three Tiers of Identity (Durand, 2002). In this model, Andre Durand distinguishes three categories (or tiers) of identities:

- *Tier 1:* The personal identity (the inner and timeless identity). This is the true personal identity that is owned and controlled entirely by the person.

- *Tier 2:* The corporate identity (the assigned identity). This identity relates to a particular context (for instance a business relationship) and represents a temporary assigned or issued characteristic for the person such as: a job title, phone number, etc.
- *Tier 3:* The marketing identity (the abstracted or aggregated identity). This identity is more diffuse, and corresponds to some result of profiling. The person is not really considered as an individual (this person does not have a name), but as the result of filtering performed on a given set of characteristics. An example could be: 'the customer belonging to the 'upper-level' social category, middle-aged, having a car more than three years old, playing golf, and living in one of the cities on the East-coast', who is contacted by a salesperson.

While this model may appear too simplistic to capture all the complexity of the Identity concept, it introduces several properties to Identity: its temporality, its conditionality, and its concreteness. What is the impact of this model on the way we capture the Identity related issues?

Temporality & Conditionality: The Personal Identity represents an inherent property of the person and is both timeless and unconditional. The Corporate Identity is, on the contrary, conditional and temporary, and exists in a given context. This later identity can also be considered as attached to a person, rather than being part of the person. These concepts have some similarity with the Ipse and Idem identity of Paul Ricoeur, mentioned previously.

These properties of temporality and conditionality are important in the context of the management of the Identity because it allows a distinction between two facets that may be managed differently.

The first one is very important to the person and should therefore be controlled as much as possible by that person herself (or by very trustworthy third entities) and strongly protected. Indeed threats on this 'pervasive' identity (it intervenes in the many facets of life of a person) will have some more serious consequences for the person since it can potentially impact many parts of her life and for a long time. For instance, the thief of personal identity (done for the purpose of conducting illegal actions) has some impact on the reputation of the victim, who may suffer some consequences to her work (forbidding access to some jobs), her social life (isolating the person in society) or her personal life (destroying trust inside the family or in the circle of friends).

The second identity is more linked to the role of the person in a given situation and can be more subject to control by a third party. Besides, the critical aspect of protecting the individual with the management of this identity may be oriented towards transparency and accountability rather than the privacy dimension. This could be relevant for mitigating the responsibility of the individual, for instance in the case of actions done as a representative of an organisation, and for isolating the representation of this identity in a specific area.

Concreteness: It is also interesting to note that an identity may not have a formal existence, and can, in particular, be abstract. For instance, the marketing identity does not explicitly represent the identity of an individual person, but an abstraction to which the person can a posteriori identify herself or be identified. Another abstract identity relates to the group or organisational identification: a person belongs to a group or an organisation not because of some formal and official status (explicit affiliation or contract), but via an implicit identification. A person believes she is part of a group or an organisation because she shares the same (assumed) attributes that characterise that group or organisation (Dutton, Dukerich, and Harquail, 1994), or via a process whereby an individual's beliefs about an organisation become self-referential or self-defining (Pratt, 1998: 175).

The abstract nature of this identity (marketing or organisational) does not prevent some very concrete consequences in the real life of the person: First, by becoming the target of direct-marketing campaigns (spamming) or psychological manipulation (advertising). Second, because this profiling (extraction of identity and categorisation) may reinforce the social structural rigidity, and may prevent people from gaining access to some resources (such as getting a loan to buy a house, or accessing jobs of high social status) because of belonging to certain social categories. The management of identity should therefore be careful and put limits (given the performance of the technology, such as data-mining for profiling) on the uses that do not contribute to the well being of the person. On the more theoretical side, it may also support the transition between the social statuses of identities (Korotov, 2004).

Another emerging consideration is the possibility given by technology to 'concretise' this implicit identity, with the advent of a whole range of applications enabled by technology. For instance, social computing services (Li, 2004) that explicitly represent and exploit the social network of a person are now proposed to help manage identity information that until now was only implicit and hidden. This is not without raising some serious new issues, such as the invasion of the 'social private life' (Kahney, 2004) that identity systems will have to address, or the risks associated to a wrong perception or the real and substantive social position identity, and the biased social identity projected via the new information media (blogs, social networks, personal web pages). For instance, in the latter case, this may mean displaying an 'arranged identity' not really reflecting the reality, even unconsciously (for instance, people tend to identify themselves with organisations or groups with high social status or socially desirable features).

2.3.3 Terminology of Identity

We would like now to report some of the terminological work that was conducted in Nabeth and Hildebrandt (2005) and that consisted of defining a series of terms related to identity. This works as a starting point borrowed from the work that was conducted by some of the participants of the FIDIS and in particular from Hansen and Pfitzmann (2008)[27] and Modini (2005). Similar works have been conducted

[27] Hansen and Pfitzmann (2008) is a continually evolving document.

by Sproule and Archer (2007) to define the terms related to identity theft and identity fraud, or the Lexicon that was developed by the Identity Gang[28]. More interestingly, these terminological works can benefit from the Wiki collaborative tool that we have described previously, and actually several of them do, including FIDIS. Finally, FIDIS has also engaged in a collaboration with ISO (International Organisation for Standardisation) so as to contribute to the definition and the standardisation of the terms used in the identity domain.

In this section we will only provide an illustration of how concepts can be defined more individually.

The Concept of Unlinkability

> *'Unlinkability of two or more items of interest (IOIs, e.g., subjects, messages, actions, ...) from an attacker's perspective means that within the system (comprising these and possibly other items), the attacker cannot sufficiently distinguish whether these IOIs are related or not.'*
>
> Hansen and Pfitzmann, 2008

This definition of Unlinkablitly is general, and deals with unlinkability of any sort of 'items'. ISO (1999) provides another definition that is more focused on the user. It defines this concept as: '[Unlinkability] ensures that a user may make multiple uses of resources or services without others being able to link these uses together. [...] Unlinkability requires that users and / or subjects are unable to determine whether the same user caused certain specific operations in the system.'

We can also differentiate an 'absolute unlinkability' ('no determination of a link between uses') and 'relative unlinkability' (i.e., 'no change of knowledge about a link between uses').

Unlinkability of an item can in particular be partial, and 'protect' only some operations associated with this item. For instance, unlinkability of an item can only concern the linking with the originator of the item (such as the author of the message) or with the recipient of the item (the reader).

An example of an unlinkable item would be an anonymous message for which it is not possible to determine the identity of the author.

The Concept of Unobservability

> *'Unobservability is the state of IOIs (the items of interest) being indistinguishable from any IOI at all.'*
>
> Hansen and Pfitzmann, 2008

Note: ISO (1999) provides the following less general definition:

[28] Identity Gang Lexicon. http://wiki.idcommons.net/Lexicon.

> *'[Unobservability] ensures that a user may use a resource or service without others, especially third parties, being able to observe that the resource or service is being used. [...] Unobservability requires that users and / or subjects cannot determine whether an operation is being performed.'*

Our approach is less user-focused and thus more general than the ISO approach. With the communication setting and the attacker model chosen in this text, our definition of unobservability shows the method by which it can be achieved: preventing distinguishability of IOIs. Thus, the ISO definition may be applied to different settings where attackers are prevented from observation by other means, e.g., by encapsulating the area of interest against third parties.

Unobservability is stronger than Unlinkability since it protects the content of an operation, and even its existence. Certainly, an unobservable item it unlinkable, since a precondition of linkability is the awareness of the existence of the item.

A similar concept is untraceability. The definition of the antonym is: 'traceability is the possibility to trace communication between application components and as such acquire private information'; traceability is the ability to obtain information about the communicating parties by observing the communication context (e.g., through the IP address).

An example of an unobservable item message would be a secret message for which other parties cannot be aware of its existence, and a fortiori, of its content.

2.3.4 Profiles of the Person, and Overview

Another conceptualisation work that was conducted in FIDIS was the identification of the different models for defining the profile of the person in different domains such as Human Resources, eLearning, mobility, or justice. The result of this work can be found in: Nabeth (2005). In this section, we only provide an extract of this work, and we invite the reader to access more complete information in Nabeth (2005).

Modelling the Person

Identity Management Systems (IMS), or systems that integrate an IMS component, use a variety of attributes to represent (model) a person and to later manage that person's information. For instance attributes can be used to represent the identifiers of a person (such as name or pseudonym), biological characteristics (gender, hair colour), location (permanent address or geo-location at a given time), competences (diploma, skills), social characteristics (affiliation to groups, friends), and even behaviours (personality or mood).

In some cases, standards and specifications have even been elaborated to facilitate the design and the interoperability of such systems. For instance LDAP schemas have been defined to specify how to represent person's information in direc-

tories. In the human resources domain, the HR-XML specification has been elaborated to standardise the way information about employees are represented in the management software (see Annex of Nabeth (2005) for an overview of different standards and specifications for people representation).

Actually, an important strand of research has been conducted for many years in user modelling, aiming at enhancing the interaction between users and systems via the design of adaptive systems (Fischer, 2001; Brusilovsky, 2001; Stephanidis, 2001; Kay, 2000; Fink and Kobsa, 2000, etc.). The goal of research on personalisation is to improve the efficiency and effectiveness of user interaction by taking into account the specificity of the person using the system (such as her cognitive style, or her competence) as well as the context of activity of this person (for instance the current tasks in which she is engaged or the organisational context (Nabeth et al., 2004)). Practically, adaptive systems are able to support users better by filtering the irrelevant information (reducing cognitive load), by delivering this information at the right time, by choosing a form of delivery that maximises its impact on users, or by proposing very contextualised help. Research on adaptive systems has been conducted for applications in a number of domains such as eLearning (Diogene, 2002), eCommerce (Kobsa et al., 2000) or knowledge management (Razmerita, 2004).

In this document, we propose a categorisation of the different attributes describing the person according to:

- A temporal perspective
- A functional perspective
- A domain perspective

Temporal categorisation: The different attributes can be first categorised by the level of permanence of the information they represent:

- *Permanent – given:* Some attributes are used to represent some permanent (given) characteristics that were given to a person and over which she usually has no influence. Examples include for instance the biological characteristics (gender, eye colour, fingerprint, etc.), some socio-cultural-economical characteristics (parents, country of birth, etc.), basic personality traits (for some psychologists such as Hans J. Eysenck, personality has an important genetic basis), etc. Some exceptions such as gender changing have to be made regarding the person's non-influence.
- *Permanent – acquired:* Some other attributes are used to represent permanent (acquired) characteristics that the person was able to acquire because of some circumstances or because of a deliberate action. Examples include qualification (either because of a deliberate action like graduating at a University or because of circumstances like learning a new foreign language during the stay in a country), and behavioural characteristics.

- *Persistent – situations:* Other attributes are used to represent a situation that is not permanent, but that has some persistence (for instance several years). Examples include the address of a person, a job position (title, employer, etc.), marital status, social status, or a network of friends.
- *Transient:* Finally, other attributes are used to represent very temporary situations that are attached to a particular context. Examples in this case include for instance the geographical position of a person at a given time or the mood of the person.

Functional categorisation: The attributes can also be categorised according to some functional characteristics. Examples of such categories of attributes include:

- identification (such as a name, the social security number, password)
- location (such as geographical location, addresses)
- biological characteristics (such as biometrics, age, …)
- personal – psychological (such as personality, psychological state, preferences)
- group – sociological (such as affiliations, social group, social networks)

Categorisation by domain: The attributes can also be grouped according to their application domain / activities in which these attributes are used such as:

- work (such as employer, title, roles, expertise, acquaintances, work context / tasks)
- education (such as university, degrees)
- leisure (such as pseudonyms used in chat spaces, friends, sexual preferences)
- government (such as registration information, tax services)
- justice and police (such as criminal files)
- health (such as social security number (ssn), medical information)

An Example of Categories of 'Biological' Attributes

The biological attributes represent the category that is used to represent the biological (or physiological) characteristics of a person. The representation of the biological characteristics can be done for several reasons such as identification, verification (access control), criminal investigation or healthcare.

Biometrical information: The first category of attributes is related to the identification of the person and includes all the biometrical information. The underlying premise is that some of the biological characteristics are permanent, intimately

associated with the person, difficult to forge and unique enough so that they can be used for identification purposes. For instance they can be used to link a person to a passport or, in the context of a criminal investigation, to link the presence of a person to the scene of a crime.

The biometrical characteristics can vary considerably, and include elements that are highly visible to the human (such as a Facial Feature) or need some sophisticated mechanisms to be analysed (such as the DNA). These characteristics can either be physiological (passive), such as iris or face recognition or behavioural (active), such as lip movement, gait or keystroke dynamics. Within the physiological biometric methods we can distinguish between morphological methods (such as facial features, iris, fingerprint or palm geometry) and those being related to the senses (including voice, thermal patterns, body odour etc.). Biometric methods and their use for identification and verification are investigated further in FIDIS D3.2.

Physiological & medical information (patient data): Another category of biological information is related to healthcare and includes the physiological characteristics that can be recorded in a medical record. Examples of biological information that can be recorder include: blood characteristics (pressure, level of albumin, cholesterol, etc.), known disease, etc.

It is important to mention that the use of these physiological characteristics can also be relevant outside of the medical domain, such as ability to practice a sport or to perform a job, insurance, etc., though in some case it raises a series of questions related to privacy protection.

Example of attributes:

- Biometric
  - Physiological (or passive)
    - Morphology
      - ⇒ Facial features
      - ⇒ Fingerprint
      - ⇒ Palm geometry
    - Senses
      - ⇒ Voice
      - ⇒ Body odour
      - ⇒ Thermal patterns
    - Other
      - ⇒ DNA
  - Behavioural (or active)
    - Gait
    - Lip movement
    - Keystroke dynamics

- Physiological and medical
  - Physiology
    - Sex
    - Weight
    - Length
    - Strength
    - Biological clock (morning / evening)
  - State
    - Awake / asleep
  - Health characteristics
    - Known diseases
    - Vaccinations
  - Health instant state
    - Blood pressure
    - Body temperature

Standards and Specifications

Several formats and standards have been elaborated in different domains to represent the person in information systems. For instance IMS-LIP is used to model the person in eLearning systems, HR-XML is used in Human Resource management system and JXDM is used in the domain of Justice[29]. Most standards specify some attributes which have identification as a principal role. For instance the name of a person, if present, is the major representation specification in LDAP, vCard, HR-XML, IMS-LIP, JXDM, etc. Some specifications are however addressing more specifically the identification dimension, and in particular provide more sophisticated 'identification attributes'. For instance, the LDAP schema includes the 'identification attributes' password and user certificate, and JXDM (used in the US) includes an attribute that is used to specify many (14) assigned ids of a person (SSNID, TaxID, DriverLicenseID, FBIID, StateID, AFISID, OtherID, RegisteredOffenderIndicator, FirearmSalesDisqualifiedIndicator, LicenseID, GeneralLedgerID, PersonHumanResourcesID, PersonVendorID, PersonNationalID).

2.4 Identity Use Cases and Scenarios

This section will present a set of use cases or scenarios that were elaborated by the FIDIS Network of excellence in order to identify and to illustrate concretely identity issues, and that are also available in the booklet 'Identity in a Networked

[29] See Nabeth (2005) for a more extended list, as well as their description.

World – Use Cases and Scenarios' (Jaquet-Chiffelle et al., 2006).[30] In this chapter, we have selected four (out of the seven in the booklet) cases and scenarios.

2.4.1 Virtual Online Social Environments, Real Identities Issues[31]

Abstract. The new Internet of Blogs, Wikis, online social networking and reputation systems, represent new virtual social environments in which rich identities are created. Although these environments are only virtual, they raise real identity issues.

The Internet has very much become a social space. People develop real and long-term friendships or relationships (online dating) in online communities (Friendster) and online games (MMORPG – Massively Multi-users Online Role Playing Games) with people they have never met in the 'physical word' and that they will probably never meet. They use online networking systems such as LinkedIn to better manage their relationships, for instance to find a job. Online vendors develop reputations in commercial spaces such as eBay. Knowledge worker create blogs as knowledge exchange channels to interact with other professionals, or to present themselves to potential employers. People participate collaboratively in the construction of online encyclopaedias such as Wikipedia. Children use MSN, or eSpace to interact with other children that they know in the physical world, or that they have only met in these virtual spaces. By doing this, people are dedicating an increasing amount of their leisure and work time, money, and emotional involvement in these spaces, which are becoming an integrated part of their life.

Identity in Virtual Environments

The reader of these lines may say 'Ok, I have understood why these online worlds are important; but can you tell me more about the online identities that people develop in these worlds and what makes them special?' Identity is particularly important in virtual environments. Since virtual environments are usually not supervised (people participate on a totally voluntary basis), the quality of the interaction that people develop in these spaces is strongly correlated to the image that people project of themselves. For instance, an effective interaction is very dependant on the level of trust between the participants involved in that interaction.

Identities in virtual environments are complex, and include both the explicit personal identities (real or faked) that are managed via digital identity management systems or declared by people when they fill in a profile (see Figure 2.3 for a screenshot of user profiles).

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[30] The full booklet can be downloaded at http://www.fidis.net/resources/networked-world/.

[31] Scenario by Thierry Nabeth (INSEAD) – taken from http://www.fidis.net/resources/networked-world/.

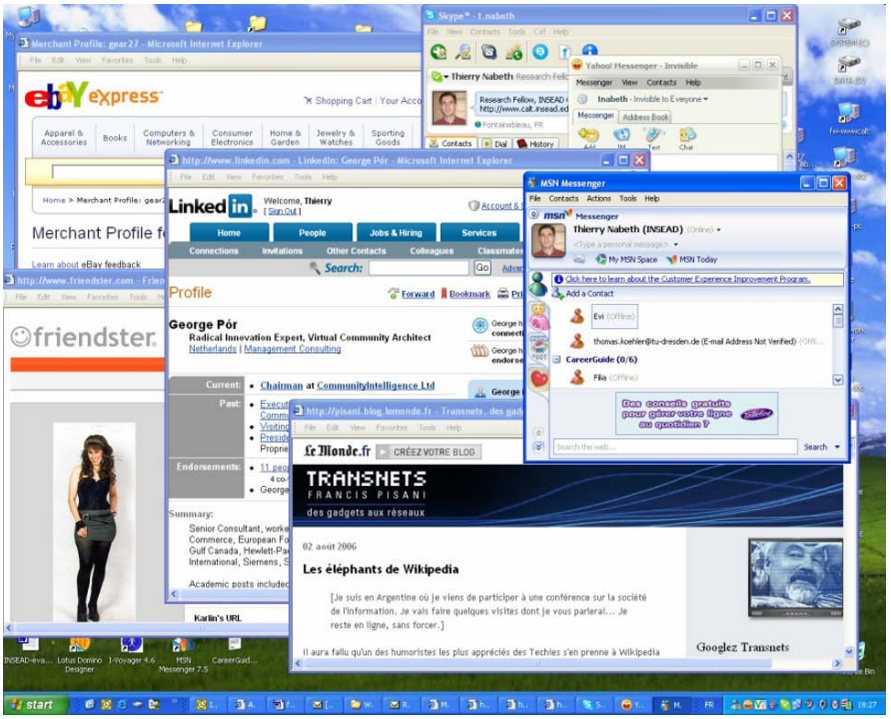

Fig. 2.3. Multiple online identities

More interestingly, they also include all the implicit social identities (such as reputation, social networks) that people develop via their online behaviours (when they post, discuss, act). This latter 'social identity', sometimes summarised as 'you are who your network is', possesses a particular significance in the digital worlds, since contrary to the off-line world, it is made persistent, and can be explicitly represented (people's relationships are for instance captured in social network services software, behavioural traces are present in log files, etc.). This behavioural information can later be exploited for instance in reputation systems to help in the forming (via social translucence mechanisms) of online reputations (one major component of social identity), and can even be mined and be the subject of profiling operations for automated utilisations.

Cases of Real Identity Issues in Virtual Environments

To conclude, we would like to list a number of examples that illustrate some Identity issues that have occurred in virtual worlds.

A short case of email identity forging, and the consequences for a person's reputation. In October 1994, someone broke into the computer account of Grady

Blount, a professor of environmental science at Texas A&M University, and sent out racist email to more than 20,000 people on the Internet[32]. The message brought death threats and other harsh responses from nearly 500 users and seriously harmed the reputation of this professor, and threatened his career (Blount said that even his research grants were put in jeopardy as a result of the incident.)

The blurring of public / private identity: being fired after posting on a blog. 'If you've got a blog and a job, beware. The two sometimes don't go together, as many ex-workers are finding out'. Metz (2004)[33] reports several cases of problems that have occurred for people who posted on a personal blog. Concretely, a flight attendant in Texas, a temporary employee in Washington and a web designer in Utah were all fired for posting content on their blogs that their companies disapproved of. They wrongly assumed that their personal blog only belonged to their private sphere.

Approaches for isolating life spheres: Multiple identities. 'I soon found myself behaving in different ways on different networks. On Friendster, I looked for people to date. On Tribe.net, I joined tribes and participated in discussions. On LinkedIn, a business-oriented service, I didn't do much of anything at all. On Orkut, I went friend-crazy. Orkut was where "my" people were hanging out, the geeks and techies and online journalists', (Leonard Andrew, 2004)[34]. This example illustrates how an experienced 'netizen' organises his 'online social network life' to isolate different life spheres (dating, discussion, business, …).

Beware of online reputation: Fraud at eBay. Should knowing about the seriousness of a vendor from the aggregated feedback of many participants in a marketplace provide a strong sense of security or not? Warner Melanie (2003) in an article[35] suggests that people should think twice before trusting too much an identity reflected by a reputation system. Jay Nelson was able to extract $200,000 on eBay, before being caught and his real identity revealed. Jay Nelson had an excellent reputation on eBay however. It just happened that Nelson managed to use several strategies to boost his eBay reputation, such as: multiple user IDs (that he used to generously give himself rave reviews), but also initially selling computers legitimately to create the illusion of authenticity. By the time negative feedback started rolling in from his subsequent fake auctions, Nelson had adopted a new online identity.

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[32] Stolen account used to send hate mail at Texas A&M : RISKS 16 (51), 27 October 1994. url: http://catless.ncl.ac.uk/Risks/16.51.html.

[33] Metz Rachel (2004); Blogs May Be a Wealth Hazard; Wired magazine, December 6, 2004 url: http://www.wired.com/news/culture/0,1284,65912,00.html.

[34] Leonard Andrew (2004), 'You are who you know', Salon.com, url: http://www.salon.com/tech/feature/2004/06/15/social_software_one/.

[35] Warner Melanie (2003); eBay's Worst Nightmare; FORTUNE, Monday, May 26, 2003 url: http://money.cnn.com/magazines/fortune/fortune_archive/2003/05/26/343106/.

2.4.2 Real Life in Virtual Worlds – Anthropological Analysis of MMO Games[36]

Abstract. Switching, undertaking, using and dropping roles and identities is as old as human civilisation. The phenomenon lives on in the age of the information society with the appearance of a new factor, network identity. ***Network identity***, although it is to a great extent determined by technological circumstances, is a human set of identities.

MMO (Massively Multiplayer Online) games are becoming more and more popular and fashionable nowadays. In the virtual world of Everquest there was a time when 12,000 players played simultaneously! World of Warcraft (see Figure 2.4 for a screenshot) had 3 million subscribers within half a year; the MMO games attract an even bigger user base in Asia – a game named Yulgang could boast 9 million subscribers within a month. Although the game style has existed for quite a long time – for almost ten years – it is only these days that an explosive growth of the market can be observed. With this growth several sub-types are generated of course, every developer tries to come up with something new, and also professionalism can be observed on a higher level.

MMO games are not only characterised by the fact that they can be played exclusively online, but also that the aim of the game is not to go through a prewritten story line, but life in a virtual world. Tens of millions of people play such games all over the world. Among them there are some who only identify themselves with a particular character temporarily, but some do so for years. The identity of the MMO players is made special by the responsibility associated with the character, which can derive from loving the character or simply from the fact that the game is paid for. It is also important that these characters not only have online but offline identities during the game, and there is a triple twist to it, namely the identity they take up in the virtual world. These identities overlap, and mutually strengthen one another.

Research has proved eloquently that, during the game, characters are not only having fun (although this is their primary purpose); they also get involved in economic activities, building relationships, careers, etc. The analysis of MMORPG communities constitutes a chance to analyse identity in different and unique ways: voluntary but strong identity; assumed identity; several oscillating identities; responsibility towards the identity; power to build and shape community; intercultural environment, financial risk; levels of anonymity and the role of technology in the preservation of identity, the issue of trust.

The real and the virtual worlds are connected in many ways, and the medium of these connections is of course the player himself. In an MMO game the participants play with several identities simultaneously: their real life identity (RL), their

[36] Scenario by Árpád Rab (ISRI) – taken from http://www.fidis.net/resources/networked-world/.

Fig. 2.4. World of Warcraft

role play identity (the character they personalise), as well as a virtual identity, which are connected to playing on a computer, such as anonymity, account etc. These identities mutually affect one another. A connection however does not only exist in the minds, but also on a physical level too.

2.4.3 Enjoy a Bar in 2012[37]

Abstract. The digitisation of life and particularly of identity may be regarded as a bottleneck in the engagement of citizens with Information Society services and particularly with Ambient Intelligence environments. The concept of identity in such environments presents two main aspects: multifacet and ubiquitous. This article deals with the concept of identity in this specific environment and describes the different facets of identity in the future.

In the Ambient Intelligence (AmI) space, a future environment combining off-line and on-line life, communications and exchanges of personal data (identity information) proliferate. The purpose of the AmI environment is to deliver seamless

[37] Scenario by Sabine Delaitre (JRC) – taken from http://www.fidis.net/resources/networked-world/.

applications and services to citizens in order to support their activities. Profiling activity is an essential and continuous background task and consists of extracting the useful information from the current context related to the user, identifying the users' needs, selecting and providing suitable services in order to allow that the AmI environment behaves according to the users' preferences, actions and expectations. Hence, the AmI vision is based on a user-driven approach with a goal to foster the integration of technology into our environment. Profiling activity thus involves the proliferation of communications, exchanges of personal user data, and identity information, and their storage by means of numerous types of technologies, sensors and devices. Therefore, a growing quantity of identity information will spread over many different systems and increase digitisation of authentication / identification processes. This implies the omnipresence of identity information, but what kind of identity-related information is ubiquitously disseminated in AmI Space?

In AmI environments, we can split identity information into three types. (1) The 'off-line identity information' can be related to appearance such as hair, eye colour, etc.; used as social information, e.g., name, postal address, phone number; and represented by identity tokens (passport, credit card, security social number, bank account number). (2) The 'digital identity or on-line identity information' can be described in the same way. For example, the information related to the

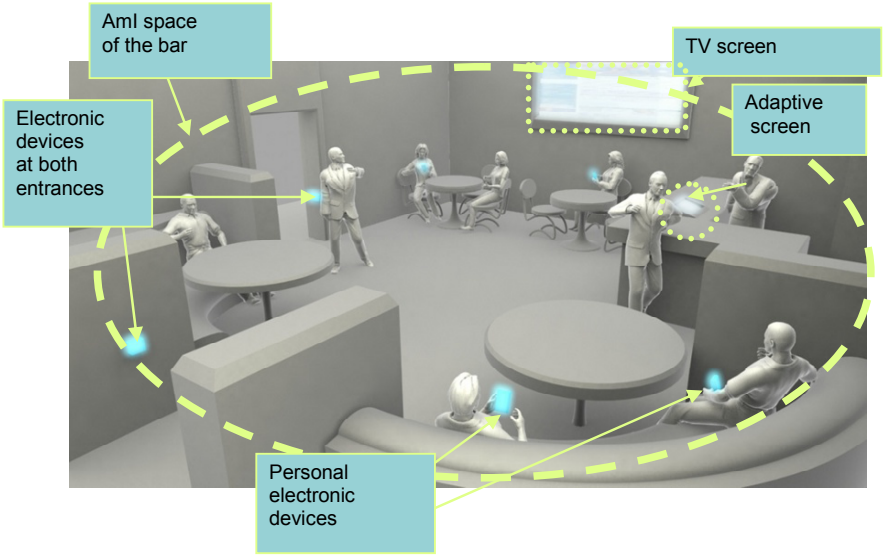

Fig. 2.5. A scene in a bar in 2012 – background image source (Beslay et al, 2005)[38]

[38] Beslay, L. and Hakala, H. (2005), 'Digital Territories: Bubbles', In *European Visions for the Knowledge Age: a Quest for New Horizons in the Information Society (the Vision Book)*, Macclesfield, UK, Cheshire Henbury.

appearance can be incorporated into a biometric template. (3) And finally 'identity information bridging offline and digital Identities' that is represented by the 'knowledge-based' identification (e.g., password, PIN) and information gathered from the user context (e.g., a user profile).

In what way does AmI shape the environment of a bar in the future? This scene (see Figure 2.5) helps describe the hypothetical features of such a bar, a specific public AmI environment.

First of all at both entrances, we can observe electronic devices (e.g., for the detection of new customers or the transmission of information); on the wall a special TV; at the bar an adaptive screen and personal electronic devices (e.g., a PDA) for some customers. The AmI space of the bar is symbolised by the dashed oval: this determines the space in which communications are enabled and all devices can interact.

The story is composed of four moments: the customer (i.e., the user of the AmI environment) enters into the bar (place), enjoys a moment at the bar, is fortunate enough to have a chance encounter and finally, he pays for the drinks.

Story: Enjoy a Bar in 2012

Entry into the bar: The customer *declares* his *preferences* (using his PDA protected by a PIN code) and *activates* his availability to meet a *friend* (Thus, the following data are transmitted – to the adaptive screen for example: his favourite drink, language etc., his user specificities, e.g. prescribed medication and list of friends).

At the bar: Barman: *'do you want a cappuccino?'* (the transmitted favourite drink). The adaptive screen shows him the soft drink options (it knows he cannot have alcohol because of his medication).

Thanks to his *electronic device* he 'watches TV in the language of his choice (preference)'. (More precisely, he listens to the sound in the language of his choice through his PDA and the corresponding image is displayed on the TV screen).

Chance encounter: An alarm *notifies* him a friend has arrived. After a nice conversation with his friend, he decides to leave.

Payment: He chooses whether to pay with *fingerprint mode* or with *RFID* (Radio Frequency IDentification) card from his local account.

Each term in italics is related to the identity concept. Table 2.1 presents some of these terms, which are ontologically described in order to examine the different facets of identity.

In this article, the concept of identity in the AmI environment has been examined. By the omnispresence of the identity related information involved in the AmI space, different facets of identity have been described and the ubiquitous aspect of the identity in the AmI space has been illustrated.

Table 2.1. Terms

Term	Identity facet representation
Preference(s)	Identifier → bridge offline and digital identities → related to the user context → profile representation → individual profile → preferences
Interaction: declares, activates, Or notifies him	Interaction → devices communication → access request → ID network (declaration) or ID electronic device (notification) → authorisation → Identifier(s) (communication of information) Remark: The declaration (declares) may be active (the user acts, e.g. pushes a button, sends information) or passive (the bar device detects the customer). activates refers to an active declaration
Friend	Identifier → bridge offline and digital identities → related to the user context → profile representation → individual profile → sociological profile → personal network (→ friends)
PDA, an electronic device	Identifier → digital identity → social information →ID electronic device → ID PDA
Fingerprint mode	1) Identity → data protection 2) Identity → storage → biometrics template Remark: Indeed, the fingerprint mode payment raises two important concepts related to the identity: the data protection and the storage of the fingerprint template

Table 2.2. Implicit terms

Implicit term	Identity facet representation
Fingerprint template (used by the fingerprint mode)	Identifier → digital identity → related to the appearance → biometric template

2.4.4 Tracing the Identity of a Money Launderer[39]

Abstract. In the information society, almost every aspect of daily life – from magazine subscriptions to financial transactions – is subject to being captured and incorporated in a database. The electronic traces are then used to develop models of who people are and what they do which, in turn, are used to inform decision-making in a variety of areas. One such area is crime prevention and detection, and this paper describes how profiling is used in the fight against money laundering.

[39] Scenario by Ana Isabel Canhoto and James Backhouse (LSE) – taken from http://www.fidis.net/resources/networked-world/.

Money Laundering: Definition and Methods

Money laundering refers to the processing of the financial proceeds resulting from criminal activity ranging from tax evasion and forgery, to drug- and people-trafficking[40,41]. The underlying principle is, in the words of the National Crime Intelligence Service: 'Most organised crime is not worth anything to a criminal unless they can launder the money. A high percentage of criminal gangs has money laundering as a secondary activity'[42].

Money launderers will use both the financial and the non-financial system to launder their money. The method involves three stages:

- *Placement* – When the money is introduced into the system. It will involve, for instance, the breaking up of large amounts of cash into smaller sums which, being less conspicuous, are less likely to draw the attention of the intermediary.
- *Layering* – A series of transactions to distance the funds from their source or destiny. In some instances, these transfers may be disguised as payments for goods or services to give them a legitimate appearance.
- *Integration* – When the funds re-enter the legitimate economy. For instance, through business ventures and the payment of tax.

Tools for Anti Money Laundering

One key component of the fight against money laundering is emerging in the development of models of who money launderers are and how they act. The modelling usually encompasses the use of automated monitoring tools – powerful algorithms that sweep the records in transaction databases for patterns of financial behaviour that deviate from the norm. The unusual behaviour only becomes a source for concern when there is no known legitimate source for the income or the observed lifestyle does not fit the one expected from someone with a specific legitimate economic activity: a sudden peak in a butcher's bank account may be due to the sale of a house rather than the reward from some criminal activity, for instance. It is crucial for financial investigators and other anti-money laundering agents to command a holistic picture of the identity of each person flagged by the automated monitoring systems.

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[40] Since 2001, this definition has been extended to include the financing of terrorist activity, a practice referred to as 'reverse money laundering'.

[41] A thorough description of the typology of money launderers is available in Bell, R. E. (2002), 'An Introductory Who's Who for Money Laundering Investigators', Journal of Money Laundering Control 5 (4), pp. 287-295.

[42] An NCIS spokesman is quoted in Scotland on Sunday (13 April 2003). See Assets Recovery Update; Issue No 1 24 April 2003. http://www.assetsrecovery.gov.uk/MediaCentre/ProceedsOfCrimeUpdate/2003/Issue1240403.htm.

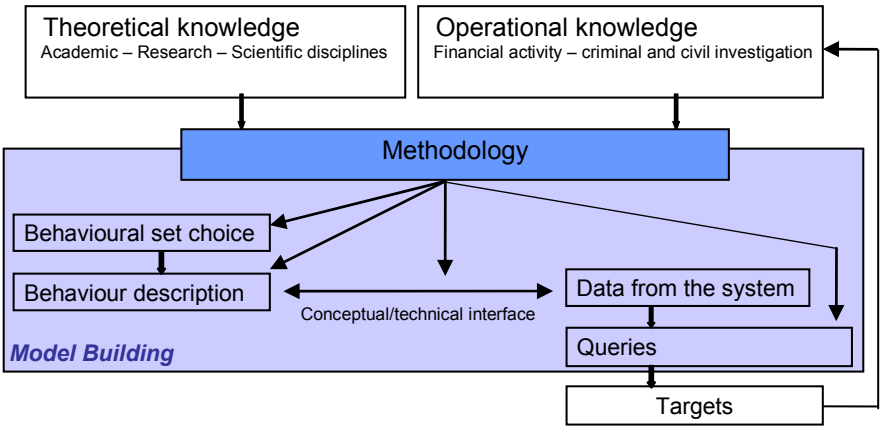

Fig. 2.6. Development of behaviour-based models to target money laundering suspicious activity

The Various Components of Identity

There are many aspects that contribute towards the identity of a person. In particular, the following four components of identity can be considered:

- *Socio-demographic characteristics* – Includes characteristics such as gender, age, ethnic group, household size, or employment status. It is based on the premise that demographic groups are relatively homogenous and lend themselves easily to quantification, measurement and classification.
- *Benefit sought*[43] – The benefits desired from pursuing certain behaviour, including the underlying motivation. It focuses on common values and attitudes across cultural groups.
- *Lifestyle adopted* – Focusing on options made regarding travel patterns, or the type of goods and services acquired, for instance.
- *Behaviour exhibited* – In relation to the financial institution. That is, based on data resulting from actions of the account holders, such as length of relationship with the bank, modes of payment and shopping preferences, product ownership, and contributions to political, religious, and charitable groups.

The next section illustrates a case widely covered in the British press to illustrate how the four components discussed above contributed to the development of the subject's identity as a money launderer and the problems it highlighted.

[43] Also referred to as psychographic profiling.

Case Study: the City PA

In the spring of 2004, Joyti De-Laurey, a personal assistant at Goldman Sachs in London, was convicted of stealing £4.3m from her bosses, through fraud and forgery, and laundering the proceeds of her crime with the help of her mother and her husband (a 50-year-old former chauffeur).

De-Laurey's gross salary with bonuses amounted to £42,000 a year[44]. Yet, during her time at Goldman Sachs, she acquired, among other things, a £750,000 seafront villa in Cyprus, £500,000 worth of furniture, £400,000 in jewellery, several top of the range cars and a £150,000 power boat[45]. The gap between her known source of income – a socio-demographic characteristic – and her exhibited lifestyle was enormous and led to alarms being raised by several financial institutions. This picture was compounded when, in court, it was revealed that De-Laurey was planning to start a new life with her family in Cyprus, and she had described herself on a school registration form[46] as a banker – an indication of the benefit sought with the behaviour pursued. The string of cheques with forged signatures being deposited into her account and, later, the transfer to Cyprus was considered suspicious behaviour. Similarly, the pattern of transfers between De-Laurey's bank accounts and those of her husband and mother implicated them in the associated money laundering charges.

The components of identity were used in order to identify De-Laurey and her associates as money launderers. The construction of someone else's identity is, however, not an objective process; rather it is one subject to the prejudices and judgment of those who engage in the identity construction exercise. Several suspicious transaction reports were filed against De-Laurey, yet the case of her being a money launderer took some time to build because, in the words of a financial investigator interviewed by the authors, she 'did not fit the typical money launderer profile: man, white, 40 years old'.

2.5 Making Use of the New (Web 2.0) Participatory Tools

In subsection 2.2.4 we presented the new participatory tools that have emerged as part of Web 2.0 and that include Wikis, blogs, social bookmarking, and social networking. In this section, we would like to present how these tools have been used in FIDIS to support the conceptualisation process of defining the identity concept. We will however be brief in our presentation, since these tools have not played a central place in the conceptualisation process, even thought we believe they represent an important potential for the future.

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[44] Kate Newman (2004), 'The power of a City PA', BBC News Online, London, 20 April, 2004, url: http://news.bbc.co.uk/1/hi/england/london/3629087.stm.

[45] BBC News (2004), 'Fairy tale' world of crooked PA, BBC News Online, London, 20 April, 2004, url: http://news.bbc.co.uk/1/hi/england/london/3614597.stm.

[46] Idem.

2.5.1 Web 2.0 Initiatives

FIDIS has explored the use of many of the new participatory tools as part of FIDIS Interactive.[47] This action was coordinated by a Steering group. Table FIDIS Web 2.0 initiatives in the appendix to this chapter summarises the different FIDIS Web 2.0 initiatives.

In some cases, the usage of these tools has been considered as potentially important, and some effort has been dedicated to make it work. This was the case with the creation of an internal collaborative platform for the project, as well as for the use of different Wikis (internal & Wikipedia). In some other cases, the usage of a tool was considered as nice to have, and able to generate value without requiring an important effort. The project therefore decided to create a blog, and to create a group in online social networking (OSN) services (in LinkedIn and in Facebook). Mechanisms were also used to explore their potential and as a way to learn about their functioning. Thus, different systems were tested such as social bookmarking services (del.icio.us), social bibliographic management service (such as CiteULike), some social platforms (AtGentNet and Ning) and an information aggregator (Netvibes). Finally other services were not used (or only indirectly), although they were considered as interesting, because of lack of time. Examples include the use of, rich social media (such as podcasting, video cast with YouTube or electronic presentations with SlideShare), or virtual worlds (such as Second Life).

2.5.2 Discussion

The idea of using Web 2.0 participatory tools to support in FIDIS the conceptualisation process of a community geographically distributed appeared very appealing. These different tools would help in supporting the creation of a shared understanding, as well as with the collaborative authoring of the definition of the concepts (thanks in particular to the Wiki systems). Therefore, it was decided to set-up a number of these systems such as Wikis, blogs, or social bookmarking and these are described in the appendix to this chapter. Yet, the difficulty of innovation adoption is not new (Rogers, 2003), and to the question 'If you build it, will they come?' the answer is generally 'no', unless you have prepared it to make it happen, and / or waited enough time. This situation proved not to be different in the case of FIDIS, since the question of participation represented a real challenge, and was not fully addressed. We will not describe in detail here all the aspects related to the adoption of these participatory tools, since their role was considered as marginal in the conceptualisation process, which was focused on more traditional

[47] FIDIS Interactive: is a set of advanced services that have been set up to support the management of knowledge inside FIDIS, and which includes the Web 2.0 tools as well as other tools such as databases or bibliographies. http://www.fidis.net/interactive/.

methods. We will just indicate that some of these tools were adopted at a moderate level in the case of the collaborative platform or of the Wikis. In the latter case, FIDIS went back and forth in using an internal Wiki totally controlled, to the public Wikis of Wikipedia, none of the solutions being considered as totally satisfactory, but also each of them bringing its benefit. Some other tools such as the blog did not manage to get a momentum and had to be interrupted because of a lack of authors providing content. Finally some other tools such as the social bookmarking or social networking managed to get a momentum principally because of a few more involved participants.

To conclude this section, we will indicate that the advent of the new Web 2.0 participatory tools promises to support in a very effective way a collective conceptualisation process in the future. However, our experience in FIDIS is that this promise is not yet fulfilled, although we were able to observe the starting of an adoption that will need to be validated in the future. We believe that in the future we will see more and more the adoption of these tools to support the conceptualisation process, for the identity domain, or for other domains.

2.6 Conclusion and Outlooks

We would like to conclude this chapter not so much by a summary of the work of conceptualisation that we have conducted, but with a reflection about what happened to work and not to work in our endeavour of conceptualising the identity domain. Concerning identity, this concept has proven to be even richer and fuzzier than what we had predicted. Besides, this concept far from stabilising and converging to a well defined and delimited definition has seen a continuous transformation originating from the explosion of the new usages that emerged given the advent of new technologies and services such as online social systems, RFID tags, or location based services in mobile communications.

As a consequence, the less formal methods for defining meaning such as the use of narratives have proved to be very effective in a number of cases to understand the concept of identity, even if the benefit of the more formal methods should not be minimised.

As we gain more experience, and as we manage to aggregate more content of the subject of identity, we expect to see in the future a better articulation of the two kind of knowledge: a very formal knowledge favouring the theorisation of identity concept, and a less formal and more descriptive knowledge based on narratives able to more easily collect and disseminate the meanings amongst a large population of participants. We believe that the new Web 2.0 participatory tools that we have presented may represent the instruments that will enable this to happen, although it is difficult to predict the time frame in which this will happen.

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Appendix: Table of FIDIS Web 2.0 Initiatives

Table 2.3. FIDIS Web 2.0 initiatives

Service	Type	Description
FIDIS Intranet	CMS & Collaborative platform	FIDIS Intranet (FIDIS Communication Infrastructure – FCI) is a collaborative system based on the TYPO3 content management framework that was used inside the project to support the management of the content and the collaboration amongst the participants. The development itself took place in the context of Work Package 1 and the work of the FCI Steering Group of FIDIS. **Status**: This system was extensively used during the project. However, the initially offered bulletin board system has met very limited success. http://internal.fidis.net/ http://www.fidis.net/ (public web site)

Table 2.3 (continued)

Service	Type	Description
FIDIS Wiki	Wiki	FIDIS Wiki is a dedicated Wiki that was created as part of FIDIS to collect definitions about *identity* terms. It is based on a Wiki plugin for Typo3 (dr_wiki). **Status**: This service is still alive, but the focus has been put to FIDIS in Wikipedia. Note: Wikis have also been used as a way to create databases such as http://internal.fidis.net/ (internal Wiki) **Note**: The TYPO3 Wiki plugin '**dr_wiki**' was designed in the project and is available and actively maintained as an open source project at: http://drwiki.myasterisk.de/ http://forge.typo3.org/projects/show/extension-dr_wiki.
FIDIS in Wikipedia	Wiki	FIDIS in Wikipedia represents the initiative aimed at using Wikipedia (the open encyclopaedia Wiki) as a way for FIDIS to disseminate some of its results. **Status**: FIDIS in Wikipedia has restarted with a less ambitious objective of improvement of the existing content. The highly regulated nature of Wikipedia has made more difficult an initially more ambitious objective of creating and taking a leadership role in defining the concept of Identity in Wikipedia. http://www.wikipedia.org/
FIDIS Blog	Blog	FIDIS Blog is a public blog that was set up to collect references and news, and to engage in discussions. **Status**: The activity of this blog has been suspended because of the lack of participation. The functionality of collecting resources has been transferred to the social bookmarking system: del.icio.us. http://blog.fidis.net/
FIDIS LinkedIn group	OSN	FIDIS LinkedIn group is a group that was set-up in the OSN services LinkedIn to allow people to declare their affiliation to FIDIS, and to support some diffusion of knowledge. Originally restricted to the participant of FIDIS only, this group was opened to every person interested in the future of *identity* in the information society. **Status**: After a slow start, FIDIS LinkedIn group is progressively getting some momentum. http://www.linkedin.com/e/gis/46597

Table 2.3 (continued)

Service	Type	Description
FIDIS Facebook group	OSN	FIDIS Facebook group is a group that was set-up in the OSN services LinkedIn to allow people to declare their affiliation to FIDIS. **Status**: Very little activity can be reported. Facebook does not appear to appeal to identity experts. http://insead.facebook.com/group.php?gid=18942353104
FIDIS in del.icio.us	Social bookmarking	Two tags: fidis and fidis_watch have been defined to allow the members of FIDIS to collaboratively tag useful resources. The resources thus collected are then aggregated and displayed on the FIDIS web site, thanks to the RSS feature. **Status**: del.icio.us has been adopted by a limited number of participants, but it is active, and appears to represent a very effective mechanism. http://delicious.com/tag/fidis_watch http://delicious.com/tag/fidis
FIDIS Atgentnet[48]	Social platform	An AtGentNet community has been created. One of its characteristics is to monitor and reason on members' activities. The access is restricted. **Status**: This platform is currently dormant, but may be reactivated in the future to experiment with monitoring and the mining of people activities. http://www.calt.insead.edu/FIDIS/ICDTManager.nsf (restricted)
FIDIS Ning	Social platform	A Ning[49] community has been created. Its function is to support social networking and collaboration for groups and communities. **Status**: Although this service is not very active, it is being used to support the familiarisation of participants in physical events (such as the PhD training event), and prepare them in the construction of a shared understanding. http://fidis-noe.ning.com/

[48] AtgentNet is a next generation social platform that was designed as part of the research project AtGentive (Nabeth, Karlsson, Angehrn, Maisonneuve, 2008). http://www.calt.insead.edu/LivingLab/AtGentive/Wiki/?AtGentNet.

[49] Ning (http://www.ning.com/) is an online platform for users to create their own social websites and social networks.

Table 2.3 (continued)

Service	Type	Description
FIDIS aggregator	Information aggregator	A Netvibes[50] information aggregator was created for FIDIS. It is used to reference stream of identity related sources and to reference FIDIS Web 2.0 initiatives. http://www.netvibes.com/fidis
FIDIS in Second Life	Virtual worlds	Second Life was considered as a way to allow participants to meet each other in virtual worlds and to explore some identity issues in these worlds. **Status**: SL for FIDIS was never created.
FIDIS in CiteULike	Social bookmarking	A CiteULike group was created to aggregate people from FIDIS, and to collect bibliographical references. **Status**: was only a test. Note: This appears to represent a big potential in the future for collecting bibliographical materials, and organise them (using tags). http://citeulike.org/group/2226
FIDIS rich social media	Rich social media	YouTube, Flickr, SlideShare, … were used from time to time. **Status**: Only used to store media.

[50] Netvibes (http://www.netvibes.com/) is an online information and service aggregator.