The Multidimensional Value of Transparency in Healthcare Organizations Computerization

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Abstract. *Healthcare informatics and related computerization represent a fundamental driving force for the evolution and development of healthcare organizations. Health information systems (in the broadest sense, as proposed by AICA with its professional certification denominated 'ECDL Health') are scheduled to become more and more important in the years to come, by virtue of the benefits that business informatics can produce in the health sector. In particular, health computerization can aid in pursuing transparency, added value in terms of health not only as regards performance and responsibilities, but also as regards organizational processes and related information flows. Our study, a conceptual paper, intends to develop a theoretical framework relative to the multidimensional value of health transparency, analyzing health information systems in this perspective, resulting from business computerization; in addition, by means of a content analysis, we recommend a more integrated 'ECDL Health' Syllabus.*

1.   Introduction

Current socio-economic scenarios are becoming ever more complex. One of the underlying causes is certainly computerization, not only in terms of hardware and software data processing (the traditional meaning of computer science), but also (and, in our opinion especially) in terms of the organizational change that inevitably derives, characterized by better organization, engineering, proceduralization and, ultimately, process/outcome standardization. Extensive use, at least in the design of the digital organizational structure, of the criterion of discontinuity [De Witt, 2001; Tonti, 2002; Bracchi et al., 2010] is another

significant factor. In conceptual terms, designing and developing an information system (in general) and its computerized parts (in particular) oblige the professionals involved to reinterpret, represent and re-engineer specific flows of information and related organizational processes, with the application of approaches that are both reductionist (*fragmentation*) and systemic (*integration*). Only downstream, therefore, will it be possible (eventually) to embed flows and processes within a computer solution, while developing a deep understanding of the business case in question.

Such efforts inspired by the end user and inevitably, implemented in functional terms could also be preliminary to the engendering of transparency, from a lexical and semantic perspective. A case in point is the absence of information asymmetry, i.e., the non-existence of situations and/or persons in the presence of uneven information alignment. Increased availability of information, however, does not mean transparency merely in terms of information symmetry: the concept of openness, on the contrary, considers other values, such as social (or collective) equifinality and ethics (or at least ethical awareness), encompassing the traditional triple line approach: efficacy, efficiency and economicity (fundamental in a healthcare context) in an all-embracing concept of 'civil health'. Clearly the concept of transparency discussed in our paper is beyond the scope of the privacy of personal and sensitive data referred to individual citizens/users/patients which is regulated by law in Italy (see Legislative Decree no.196/2003).

In IT language, at least as concerns Italian, the term 'transparent', refers to any computer application, designed and/or implemented at any level, in which an operator (potential user) is not required to know how the system really works in order to use it. Transparency in other words, comes very close to usability, i.e. the minimum gap possible between the user model and the design model.

In a parallel manner, for the final beneficiary, i.e. the citizen in the broadest sense, the more a health system is 'transparent' the more 'usable' it is, both in operational and social terms. Health informatics or better health computerization, represents an important contribution in this direction. It can be considered the mental and cultural propensity underpinning the governance and management of health data, information and knowledge in computer terms, and their effects on organizational processes and information flows [Teti and Festa, 2009].

Our study, a conceptual paper, aims at elaborating a theoretical framework for an integrated analysis of the multidimensional value of health transparency deriving from the computerization of health organizations, where transparency is a guiding principle for the design of health information systems. In addition, we intend to investigate the potential dimensions of health transparency within the ECDL Health Syllabus (a standard professional certification, recognized internationally and issued in Italy by AICA, for health informatics). Our aim is to attempt to contribute to the potential integrating of the Syllabus as regards transparency in health informatics, taking into account also recent Italian regulations.

2. The multidimensional value of transparency in the health sector

Neoclassical (or marginal) economics which have impacted most on current interpretations of economic events, defines 'value' as the appreciation of a utility (of time, place, possession and form), which in the case of health, becomes a 'subjective use value' (the exact neoclassical phrase) of the tangible, intangible, financial, professional and technological capacity (the traditional function of production) of health facilities to meet needs/desires in physical, mental, social and environmental terms (in accordance with the definition of 'health' proposed by the World Health Organization). In this sense, healthcare value is considered from a 'technical' point of view [Tramarin, 2002].

In truth, even in classical (although not core as in neoclassical) economics we find the principle of 'utility', emphasizing in particular the concept of marginal utility as the pivot of economic dynamics [Da Empoli, 2012]. In addition, the term 'professional' in the health sector and in our perspective, includes also the personal and public contribution of health communication, considered nowadays fully and rightly an essential component in producing the health service and in providing outcomes.

To legitimize its value, from a 'commercial' point of view, goods should be 'market' orientated or be of interest (and hence value) as an object of exchange: a) different goods have varying values (e.g. a cure for cancer has a completely different value compared to cosmetic treatment); b) some goods have value for some people and not for others: in other words, there may not be the same interest for these assets (cancer treatment is out of context and therefore worthless to a person desiring cosmetic treatment); c) similar goods have different values in different contexts (depending on the customers requiring them).

Undoubtedly, appreciation is not limited merely to economic monetary valuation, classified in terms of the marketing mix as 'price', the measure of commercial exchange, but end up inevitably including other elements intrinsic to exchange (time required to gather information on purchase options, the contextual specifics of purchase and consumption, stress in the decision-making and in potential cognitive dissonance, etc.). Clearly therefore, the same utility, for two different buyers / consumers, may have the same 'price', but be attributed a different 'value', because appreciated in discretionary, subjective and therefore psychological terms.

Finally, in an economic and business perspective, value can be detected even from an ethical and social point of view. A particular example is the 'means-end chain' and its *instrumental* and *terminal* values (Reynolds and Gutman). In this model, 'instrumental' is the value deemed a necessary and/or sufficient condition for achieving a further purpose, while 'terminal' is the value which represents a specific purpose [Lambin, 2008]. In the health sector, for instance, the effective competence of the organization represents a health instrumental value (in ethical terms, a physician has to be competent, so to provide an appropriate service for the citizen), while a terminal value (the terminal value *par excellence*) represents the health of the patient in particular and the health of the

community in general (in social terms, fundamental in all healthcare systems, but especially in systems based on solidarity, as in Italy).

'Transparency' can also be attributed to one or the other category (instrumental or terminal). In the context of the public administration, for example, the absence of even the mere suspicion of corruption is a fundamental attribute of multidimensional public interest (i.e. transparency as a terminal value, with a marked 'social' connotation), but it is clear that especially in an organizational perspective, and particularly in the health services area, it can also be connoted in essence, as instrumental value, improving performance in terms of management (more effective, more efficient, cheaper and generally more 'legitimate' and more 'ethical') of available resources.

Considering a single utility, a citizen of the Campania Region for example may not have a direct interest in how transparent the waiting list of a healthcare facility in the Lombardy Region turns out to be, but she/he could quite rightly have an indirect interest (both 'ethical' and 'social') to the effect that all Italian citizens should benefit from the same treatment, a right sanctioned by the Italian Constitution (art. 3 the right to equal treatment and art. 32 the right to good health). The Italian National Health Service permits (and in some ways offers incentives towards, in terms of competitiveness) regional mobility, whereby a citizen of the Campania or any other Region can expect transparency in the management of a hospital waiting list even in the Lombardy Region.

The example is purely theoretical and obviously is without prejudice. However, the mobility rate indicates respectively a positive and negative trend in the two Regions, North and South. As will be highlighted in this paper, in order to strengthen further the claim of transparency in the national healthcare system, the National Health Service emerges as an integrated system, both at the structural level (hospitals and similar structures), sectorial (in the sense of first, second and third sector) and regional (i.e. from Region to Region within the Italian territory, but even outside national borders, following procedures required by the specific health organization of reference).

From the perspective of the citizen/user/patient, it should be noted that in normative terms, "... transparency is understood as total accessibility, including the publication on the websites of government departments relative to information concerning: the organization; indicators relating to performance management and use of resources; results of measuring and evaluating carried out by the competent bodies in order to encourage widespread forms of monitoring and compliance with principles of good conduct and impartiality. Essential levels of service are provided by the government in accordance with art. 117, second paragraph, letter m) of the Constitution" (art. 11 – "Transparency", paragraph 1 of Legislative Decree no. 150/2009, "Implementation of the law dated 4th March 2009, no. 15, for the optimization of productivity, efficiency and transparency in public administrations) (*our translation, also for what follows)*. More generally, an information system can be envisaged as moving along a continuum: at one end public regulation and at the other, the absence of public regulation (this is never completely the case however, especially in the health sector). In the Italian health system, as mentioned above with regard to the 'sectorial' level, privately run hospitals are numerous (for-profit or non-profit), integrated at different levels with the public

sector. Private healthcare organizations accredited by the National Health Service are institutionally, virtually identical to those of the public sector. In cases where they are not accredited however, authorization is necessary to carry out clinical/healthcare activities, which are subject to a 'publicising'. Clearly, being deprived of 'accreditation' is detrimental both in economic terms and the contrast of interests in favor of the community/society. Thus, information asymmetry may have more space, save positive pressures arising from sense of responsibility, deontology, ethics, etc.

In normative terms, the Legislative Decree no. 33/2013 ("Reorganisation of the rules concerning the obligations of disclosure, transparency and dissemination of information by public authorities") is "... prepared for the implementation of principles and criteria under the delegation of art. 1, paragraph 35 of the Law of 6th November 2012, n. 190, on "Measures for preventing and combating corruption and illegality in public administration" [and] reorders, in a single regulatory body, numerous laws relating to obligations of information, transparency and publicity by public administrations. [...] Some of the most important [...] include: the establishment of the civic right of access, the obligation to prepare and publish a three-year plan for transparency, the obligation to appoint the person responsible for transparency in every administration, a review of the rules on transparency in the patrimony of politicians and public administrators and their nominees, the obligation to define in the home page of the corporate website of each entity a special section called 'transparent administration'" (source: Vv.Aa., "Provisions on transparency in public administrations – Information note on the Legislative Decree no. 33/2013", ANCI, April 2013). Art. 41 of the Decree, in particular, is reserved exclusively for healthcare administrations and agencies (see extract from the Official Journal).

Transparency of the National Health Service.

1. *The administrations and agencies of the national health service, regional health service, including local health authorities and hospitals, agencies and other bodies and public agencies involved in planning and delivery of health services, are liable for compliance of all disclosure requirements, established by law.*

2. *The health agencies and hospitals publish all information and data concerning the procedures for appointing the general director, medical director and administrative director, as well as the positions of head of department and head of simple and complex structures, including notices, the carrying out of procedures, the conferment deeds.*

3. *For medical managers mentioned in paragraph 2, with the exception of those responsible for simple structures, the disclosure requirements laid down in Article 15 are to be applied. For professional activities, pursuant to paragraph 1, letter c) of Article 15 also professional services performed under intramoenia are to be intended.*

4. *It is published annually and updated the list of accredited private health organizations. Also the agreements signed with them are published.*

5. *The Regions include compliance with the requirements established by the law among the requirements for accreditation of health organizations.*

6. *Institutions, hospitals, public and private organizations that provide services on behalf of the national health service are required to specify on their website, in a special section called 'waiting lists', the expected waiting time and the average time to wait for each typology of service provided.*

In general, therefore, it seems possible to articulate the concept of 'value' in at least five fundamental components: technical, commercial, psychological, ethical and social. In the perspective of the present work, we intend to investigate the specific value of transparency in health, in particular when accompanied by computerization, contestually more or less pushed ('low' or 'high') by/of the health organization: this integration is derived from a theoretical framework, in other words a kind of conceptual map, see Fig. 1, which summarizes the modes of evolution – which could also be considered further 'values' – whereby greater (or lesser) transparency in the health organization is achieved, thanks to computerization (e.g. in the presence of scarce computerization, as shown, more opacity results).
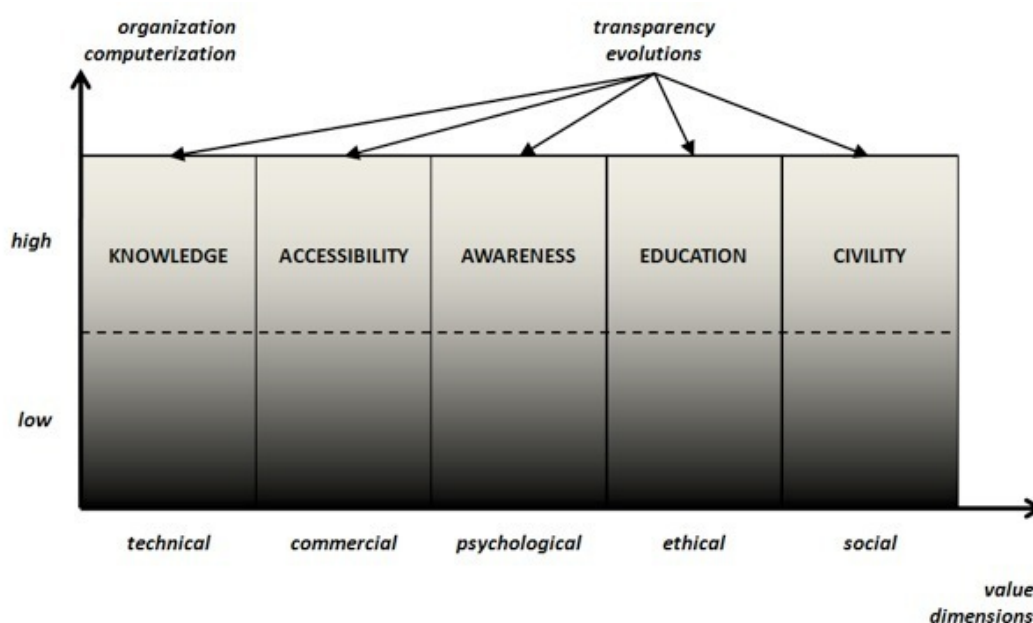
Figure 1
Evolutions / values of transparency in health computerization

Transparency, considered first of all an organizational need, actually becomes a real expectation in more informed modern societies. A classic example is the New York Times new building, designed by the architect Renzo Piano with an extensive use of transparent glass, symbolizing the absolute honesty of the newspaper in favor ot its readers and society in general. Citizens, dynamic, conscious, alert, needing/wanting quality, are investing even more heavily in economic and cultural terms, in correct behavior (*ethics*) and subsidiary (*social*) 'civilized' values. More transparency should result also in less bureaucracy and greater productivity potential, but it should above all, push organizations that are promoting it to operate in a more honest, open and healthy manner.

Without ethics, however, in a concretely modern vision of business scenarios, it seems not possible to aspire to quality, which, in the absence of 'business-generic' ethics, would be limited to mere technical results, not realizing the normal ambitions of entrepreneurial sustainability. Moreover, it is clear that transparency finds an enemy not in bureaucracy (which, mechanical or professional, remains one of the basic organizational configurations), but in the excess of bureaucracy, that emerges when unnecessarily formal, harmfully redundant mechanisms coarsen the efficacy and efficiency of organizational functioning.

3.   The multidimensional evaluation of transparency in the health sector

Nowadays, data, information and knowledge have become real assets, probably the most important; thus, they have to be protected, both in the phases of production, storage, distribution and use. They can also evidently, be considered in more economic and business terms, i.e. 'goods', resources, which normally are scarce, later requiring both governance and management. In particular, such goods are intangible resources, with their own value (autonomous and marketable), seeing as, (as mentioned previously) they can be produced, stored, distributed and consumed [Gambaro and Ricciardi, 2003].

It is evident that a person in possession of a particular item of information, i.e. information that would be useful in a given context, has a specific advantage, if compared to an individual in the same situation without the information in question. Information asymmetry, as in this case, is generally a situation of economic injustice, in many contexts perfectly legitimate and profitable [Schilling, 2009]. However, if linked to access to healthcare, it becomes intolerable generally speaking and even more so in a solidarity system such as that in Italy, strictly based, at least in theory, on equity and equality.

It is no coincidence, in fact, that in the studies of general economics information symmetry and asymmetry constitute hypotheses capable of projecting scenarios completely different. Indeed, studies that are based on the perfect symmetry are obvious artifacts of reality, even though, obviously, they constitute a fundamental basis for the development of models of economic functioning and behavior with an undoubted social importance (we may think, for example, of studies on perfect competition, the theories of Modigliani-Miller, etc.).

Such information asymmetry in healthcare can occur at different levels: the most 'intolerable' refer to the opportunity/possibility, for some to use services or have access to services in a more advantageous, 'competitive' manner compared to others (one person booking an x-ray is obviously competing with another patient/citizen in need of the same exam), or, even more generally, with respect to the community. The crux of the question is that in healthcare systems based on solidarity benefit mechanisms for one to the detriment of others (e.g. 'private' healthcare), should not exist, only wellness and welfare. Studies of health economics, although based mainly on negotiation mechanisms of individual utility (i.e. the agency theory, with the general practitioner in the role of *agent* and the patient in that of *principal*), cannot ignore the prospect of equity, especially in terms of allocative efficiency and therefore in the perspective of health planning [Dirindin and Vineis, 2004].

In healthcare, in particular, the cost of information can engender dual degeneration: moral hazard (i.e. defensive medicine) or adverse selection (information is paid for only by disadvantaged subjects) [Ziliotti, 2001; Cappelli and Renzi, 2010]. Without a policy of transparency therefore, traditional economic considerations in terms of uncertainty seem to vert [Sofio Donia, 2001] on the propensity – or otherwise – for risk (for example, in the triage) [Rumiati and Bonini, 2010].

Transparency may also be necessary not only to combat the degenerations of information asymmetry, but also negligence relating to information and communication. In fact, patients very often are not informed about the potential range of services performed by a given structure, obtaining information either from their general practitioners, the mass media or by word of mouth, in order to make delicate decisions. It can also happen, on the other hand, that the well-informed individual has to adopt a policy of transparency in order to benefit (not having, in other words, exclusive rights to the information); or, that the well-informed individual communicates such items of information to others either in order to obtain a filter effect of such knowedge or as a collective experience (e.g. the increasingly popular role of social networks relative to health and healthcare).

In economic terms, the contribution of the transparency can be analyzed firstly in the perspective of the two main objectives of the appropriate functioning of any organization, i.e. efficacy and efficiency, enhanced, in the health sector in general and in the public sector in particular, by 'economicity' [Tommasetti and Cuccurullo, 2004; Marinò, 2008]. It is only common sense that a more transparent organization (in terms of legality, ethics, accountability, meritocracy, competitiveness, etc.) implies greater efficacy and efficiency if compared to those adopting more opaque policies; the reference to 'economicity', in addition, stretches the concept in the direction of universality, equity, justice and so on, all of which are sadly lacking in health systems that lack transparency.

In business terms, however, the concept of transparency becomes an enabling factor for competition, flexibility (both technical and economical), a focus for specialization and so on. Generally speaking, therefore, transparency in (health) markets encourages the integrating of virtuous conflicts of interest, enabling an in-depth understanding of the choice mechanisms of the performance mix.

In the health sector competition always is (should be) internal and not external, i.e. committed to delivering even better performance once a 'basic level of care' is guaranteed, hopefully, standard in benchmarking terms and patient-centred. The inevitable option of internal competition will mean that there could (should) be no competition between good and bad healthcare systems, but only between competitive levels of quality within the same. Transparency, therefore, becomes a necessary step firstly, to bring out the 'good' or 'bad' cases and, secondly, in order to classify or compare cases that are at least 'good practice'.

In the perspective of competition, it seems natural that transparency is an intrinsic virtue for operators who are more competitive (higher performance, more ethical, etc.), or for those whose outcomes/output are quality driven. Better performance (or at least a susceptibility/attitude to transparency) should be properly informed and communicated in a perspective of resonance with the stakeholders of the socio-economic environment (internal and external and, in

the latter case, micro and macro). Such performance also involves rational and emotional behavior that fosters market expectations in line with more transparent health policies in which standards (low or high) should match those of other competitors.

The same healthcare for everyone means that any technical tool (from gauze to syringes, from the stethoscope to the electrocardiograph, from scanner devices to those for computerized axial tomography and so on) are objects with an information content. Over time, they also become more precise and analytical thanks to the greater technology incorporated, especially knowledge input. In a certain sense, therefore, technology produces 'better' information and requires a health technology assessment (HTA). To deal with the evaluation of health technologies, HTA naturally, measures not only the technology itself, but also potential information and its subsequent use in a clinical process [Arduini, 2010]. Thus, it seems logical to apply criteria used for the economic evaluation of HTA also to transparency, envisaged as a factor capable of producing greater efficacy, efficiency and economicity in health care, a process in essence, borrowed from pharmaeconomics.

Some criteria for the appreciation of the (multidimensional) value of transparency in healthcare, according to the basis of representation can also be determined. The individual value of transparency can primarily, be attributed to the absence of asymmetric information: in economic terms, evaluation criteria should coincide with the elimination of collective/social costs equal to the enlarged net present value for the better informed subject. To the individual, in particular, the first three dimensions (at least) represented in the framework, i.e. technical, commercial and psychological, can be ascribed.

'Extended/greater' value could be achieved also within the healthcare organization by simplification and acceleration (with the same or improved standards of safety and quality) in terms of the different operations (internally i.e. bookings for specialist treatment made by indvidual departments to clinics, laboratories, radiology units, operating theatres, etc.) together with greater uniformity (and therefore, greater efficacy, efficiency, economicity) in organizational procedures, quality systems, accreditation paths, etc.

In our present society, characterized by immaterial production, distribution costs (in terms of media disposing of information) are less than production costs (e.g. information transmission via the Internet). This situation is (or at least should be) known to the parties involved, i.e. bidder (individual) and buyer (individual/collective). In case of asymmetry, however, it is quite possible that those not in possession of the information (or do not know how to use it adequately, resulting in an asymmetry of 'theory' and another of 'practice') will be damaged in economic terms, although the cost could be low if both costs and resources are shared (i.e. with the operator in question having the information, knowing how to use it, but without the necessary resources – physical, financial, etc. – to use it). Moreover, information that becomes public automatically generates transparency and immediately loses value for the individual (agent), becoming even if only potentially, an infinitely greater value for the society.

In fact, whoever produces specific information, if valid and reliable, would most likely suffer no great cost (since the information exists now, it makes no sense to reproduce it more economically, but at most refine it to produce other information). This shifts the perspective of the analysis from the information economy to the knowledge economy, in terms of organization and distribution (i.e. mainly in coordination terms). As in any other economic environment, since information has a

value, producers, intermediaries and users (which may also coincide) are involved: if a user would like to retrieve x information individually, it would involve costs: $C_x \times N$ would be the total cost for all N users who wish to obtain x information individually (e.g. the direct and indirect costs that individual users, not in communication with one another, undergo when attending the Reservation Unified Center for information relative to the waiting list of a radiology department).

In symmetrical terms, once the communication infrastructure, including intermediaries (with the cost compensated for by extent of use), only C_x, would result because the direct costs of distribution of the information would be nearly zero at some point (or at least asymptotically approaching zero), while in a polyarchy structure, as in effect the organizations that produce or consume services and benefits in healthcare are, the number of connections needed to cover all the needs of communication is equal to N (N -1) in the case of one-way flows of information, or N (N -1) / 2 in case of bi-directional flows of information. Clearly enhanced value generally expressed in quantitative terms (units), would ultimately result from related social aspects.

As the complexity of health needs grows, the complexity of clinical information also grows, but this is not necessarily the case of the complexity of the communication infrastructure (e.g. health data, simple or complex, delivered on the same intranet). It is evident, therefore, how much saving both internally and externally, could result from transparency, engendered by the increase of resources available to attribute greater added value to the production of health services.

The 'ethical' value in transparency is as we have said, also fundamental, due to the need for the 'normal' functioning (legal, fair, caring, etc.) for any kind of service in favor of an individual and/or a community. In economic terms, evaluation criteria for this case should be the decisional analysis mechanisms, i.e. ratios of cost/effectiveness, cost/benefits, and cost/utilities. By virtue of transparency, it becomes potentially feasible to combat corruption, cronyism, favoritism (a sort of 'black area') thus increasing economic value in general for the state and for society.

Finally, 'social' value derives from transparency, due to solidarity in favor of any other individual in society. In economic terms, the criterion for assessment could be value for money. The social value of transparency, however, is the founding principle of additional values, instrumental from the 'means-end chain' perspective: i.e. the importance of equal treatment for users/patients or the availability of evidence of clinical practice for health professionals.

Transparency, on the other hand however, is potentially capable of generating not only advantages, but also disadvantages, at least in terms of situations at risk, just like any socio-economic case. In social terms, transparency might also lead negatively to insensitivity towards the individual in situations of distress (for example, inflexible respect of waiting list planning), while in economic terms, negative outcomes from excessive red tape deriving from observing principles of transparency (e.g. undue attention addressed to 'procedures'). Evidently these are degenerations, but unfortunately, quite capable of producing potentially negative effects in highly complex environments and contexts especially from a humanitarian point of view.

Another hypothesis of non negligible risk nowadays concerns the excess of information deriving from transparency, which is one of the 'disasters' of the information society. In healthcare, in particular, the excess of information could also result in litigation or rather the increase in litigation since this is quite widespread in the healthcare field.

4.   The 'transparent' design of the health information system

In the perspective of this study, one of the main goals pursued from a multidimensional approach to organizational transparency (in addition to compliance with legislation and ethics) is the greater propensity of the structure for efficacy, efficiency and economicity. In terms of excellence, this means producing more and better, utlilizing fewer resources and resulting therefore in more sustainably. This economic ambition, in a sector as complex as healthcare, is linked above all to the social appreciation of such an approach, oriented to the production and delivery of health [Bellucci and Cardoni, 2008].

Consequently, an enterprise information system, especially for particular organizations such as health care structures, can be envisaged also in terms of transparency of information both internally and towards the outside. Transparency of organizational information to date, especially in the public sector, has always been seen as a kind of 'antidote' to malfunction (which in the case of health becomes specifically 'medical malpractice', not only in terms of outputs, but also in terms of means), but as we have already shown, important benefits are to be gained for organizational economicity, as a sort of positive externality on the contrary.

Assuming the perspective of transparency as a driver for the design of the organization and especially of the information system, it seems possible to delineate a logical and methodological approach that should lead to the transparency of information and, downstream, of the organization, which is the main purpose of our discussion. By following a 'shrimp' approach, very often used in project management, it is easy to argue that one can obtain organizational transparency (necessarily) only in the presence of information transparency; upstream, the latter is a consequence of information sharing, which, in turn, depends increasingly on the computerization of the organization; further upstream, this is a consequence of the implementation of organizational procedures (i.e. in the language of knowledge management, operating transformations from continuous to discontinuous), which, in turn, depend on organizational formalization, which, finally, descends, in the specific case of health and in a transversal vision to different health structures, from natural reference to professional bureaucracy [Mintzberg, 1996].

It is clear, as noted above, that transparency cannot constitute an end value in itself (except perhaps only in the public context, i.e. Legislative Decree no. 150/2009), but in more pragmatic terms, it is merely an instrumental value. Routine operations in healthcare enterprises will inevitably, therefore, have to remain discretionary (i.e. the classic example of urgency in waiting lists), because obviously, the patient and not the disease, or worse the procedure itself, has to be considered. It is equally obvious however, that discretionary procedures cannot become the primacy of the individual. Transparency of internal rules and limits of discretion does not prevent opaque situations, but at least it limits them as far as possible: i.e. 'clinical discretion', a clear example of properly exercised discretion, if justified and transparent, in a rigid system of constraints.

In modern healthcare it is clearly anachronistic to think of organizational functioning or professional behavior inspired by a procedures in the bureaucratic sense, lacking adequate contributions of communication, attention, empathy, etc. At the same time, however, we cannot run the risk of being only on the side of the patient, because we should also be on the side of the healthcare operators, exposed as they are to growing complexity. In this sense procedures, clearly detailed, thought-out, designed, tested, validated and appropriately and promptly updated, are expected to be a fundamental contribution to the good exercise of the profession; also from a psychological point of view, because it reassures the operators in their relationship with their patients. Thus, transparency can obviously help to improve the organizational climate and consequently the psychological and performance profile of the healthcare individual professional.

As nowadays enterprises do not compete with each other as individual companies, but as integrated supply chains, no individual physician can be considered competitive except in her/his healthcare organization taken as a whole. From information to 'transparency' then can the contribution to efficiency be derived not only in terms of the individual enternprise, but also of the healthcare network as a whole. A transparent health information system would be an example of a highly concentrated network structure in terms of resources, performance, outputs and outcomes, and so on. In social terms, it should be considered also as a vector of equality for access to health services in a multidimensional sense: quantity, quality, speed, efficiency, cost, etc., valid for all circumstances and contexts, but especially for health systems based on solidarity (equal access may also mean transparent compiling of waiting lists, adequate information about services and performances, awareness of the mix between internal and external supply – i.e. intramoenia – and so on).

Unfortunately, even so, in the health sector there are boundless levels of information asymmetry (internal and external with respect to organizational confines) not only in 'traditional' scenarios such as labor, credit, insurance, etc. The service sector is certainly that with more abundant information content and therefore information and even more so the absence of information, is a critical resource for health services. In the modern healthcare system, information travels at network speed, via a macroscopic socio-economic supply chain (through, vertical and horizontal subsidiarity, at least in Italy). Without information and communication, a health organization is destined to remain a monolithic entity, not only opaque as to operations, but also isolated in terms of the competitiveness of the health system market (it is likely that having the opportunity for choice, patients would tend to use the most transparent structure).

The push for transparency, however, is amplified by the diffusion of web 2.0 tools, which constantly produce user-generated content, often considered as more reliable sources of information and communication. The reason for such interpretation is obvious: citizen opinion, especially if organized within huge communities, is associated automatically with greater value, because of an innovative word-of-mouth process, counteracting the traditional absence of transparency on the part of official bodies.

In addition, web 3.0 (i.e. the semantic web) is now also on the web horizon. It is bound to represent a real cultural revolution for the Internet in the traditional sense, but it will also provide a decisive push in the direction of transparency. At the basis of this new web philosophy, is data and related content authentication

which should restore reliability to the information found on the Internet, producing in turn even more trust.

Transparency, furthermore, as mentioned in the Introduction to our paper, is fundamental in the sense that we must not only distinguish environments/contexts lacking information/communication from those characterized with a higher intensity or even by an excess of information, the latter ending in effect, in a substantial lack of transparency. A particular example is an article of the Brunetta Reform in Italy (Law 15/2009 and Legislative Decree no. 150/2009), which requires public bodies to communicate by Internet the remuneration paid for appointments conferred in the public sector: the effort is certainly relevant, since it indicates an effective cultural change, but it should be stressed that this form of 'transparency' is often cumbersome, because frequently only available through 'hidden' links or through data published in 'pdf' format, not aggregated/disaggregated for integrated and/or cross analyses, and therefore, not generating widespread data usability.

In such an evolutionary scenario, a significant role for health service computerization can be played by ECDL Health, which is the most recent computer science certification for health professionals (for which in Italy AICA is responsible). Certification is mainly focused on criteria for healthcare data and information processing. Investment in training for widespread appropriate use of health informatics, in the past regulated by law (in Italy the first version of Annex B of the Legislative Decree no. 196/2003, modified in 2012 by the 'Simplifications Decree' of the Monti Government), respond to the fundamental attention that needs to be addressed to human resources, which constantly play a unique role in the organization, the rationale being that the most sophisticated computer system is actually worth very little if used by incompetent staff, inadequately educated and trained for exploiting the technology to the full.

The above considerations as regards transparency can thus be contextualised to ECDL Health as it is our firm conviction that such value, especially by virtue of its multidimensional nature, has a considerable potential precisely in the health sector. In other words, transparency can be considered an important principle for the design of health information systems, consistently generating downstream the need/opportunity for awareness in healthcare workers of the sense and motivation for the appropriate use of daily healthcare informatics. In any case, even beyond the perspective proposed in this study, the re-adjustment of the cultural horizon on the part of the ECDL Health, at least with respect to recent changes in regulations as regards transparency in the Italian Health Service in general, would be essential.

5.   A content analysis of the ECDL Health Syllabus

Underpinning the professional certification in question is a body of concepts, knowledge and skills in the field of health information systems which has been formalized within the Syllabus - 1.1 divided into 4 sections: 'Concepts'; 'Hospital tasks'; 'User's skills'; 'Policies and procedures' (a total of 52 items) constituting the assessment framework in order to obtain certification. The Syllabus, a knowledge reference for health information systems, also in an international

perspective, is subject to updating in the event of development of reference skills (computer science, organization, law, etc.).

In 2013 a new version of the Italian Syllabus (1.5) was released. though it is currently still under internal review on the part of the AICA working group on ECDL Health. Syllabus 1.5 retains the division into 4 sections (but from 'Hospital tasks' it evolves to 'Professional duties and responsibilities') and increases slightly the number of items from 52 to 54.

By virtue of this new Syllabus, it was considered useful to make a content analysis of the two versions of the Syllabus (1.1 – and 1.5) to ascertain the extent to which the concept of transparency is taken into account, especially in view of recent regulatory changes in Italy (Law 15/2009, Legislative Decree no. 150/2009, Legislative Decree no. 33/2013). The methodology of the survey was structured as follows:

A. definition of a keyword set, connected to the multidimensional value of transparency studied in this work, traceable in the text;

B. identification and measuring of the (absolute) frequency of occurrences;

C. identification and measuring of the (cumulative) frequency in the reference areas (as regards lexical proximity);

D. comments on findings/outcomes.

By means of this methodology, keywords were considered as follows: terms associated in a general sense to health information transparency, i.e. *transparency, appropriateness, timeliness, accessibility, sharing, confidentiality, identification, recognition, integration*. In addition to nouns, related adjectives and adverbs (from appropriateness, we parsed appropriate and appropriately) Subsequent to initial analysis, it was decided to include also the terms 'access', 'accesses', 'identify' and 'recognize'.

We then proceeded to calculating occurrences, using, due to the limited universe under investigation, standard office automation tools. The results of the analysis are given in Table 1 (the Italian terms are repowered on the basis of number and gender).

We found that:

• the concept of transparency in the strictest sense is never expressly stated in any of the two versions of the Syllabus, as the reference area registers zero occurrences, albeit summing up all the keywords of the area;

• the concept recording the highest number of occurrences, at area level and in both versions, is related to the term 'accessibility', which in some ways obviously recalls transparency, both from the perspective of internal users (health professionals) and that of external users (patients and citizens);

• the concept expressing the most numerous increase in percentage of occurrences, at the area level, is related to the term 'integration', which, however, together with that of accessibility, seems to define at least in the internal perspective of health information systems, the horizon of the 'transparent' organization;

• in the new version of the Syllabus all the concepts analyzed show a number of occurrences equal to or greater than the previous version (the concept of transparency, as commented previously, is absent in both versions).

Analysis of the Occurrences	Syllabus		Areas		Analysis of the Occurrences	Syllabus		Areas	
Keyword	1.1	1.5	1.1	1.5	Keyword	1.1	1.5	1.1	1.5
Trasparenza	0	0			Riservatezza	5	6		
Trasparente	0	0	0	0	Riservato	0	0		
Trasparenti	0	0			Riservata	1	1	6	8
Trasparentemente	0	0			Riservati	0	0		
Appropriatezza	0	0			Riservate	0	1		
Appropriato	1	1			Riservatamente	0	0		
Appropriata	1	1	2	3	Identificazione	0	0		
Appropriati	0	0			Identificato	0	0		
Appropriatezza	0	0			Identificata	0	0	2	6
Appropriatamente	0	1			Identificati	0	0		
Tempestività	0	0			Identificate	0	0		
Tempestivo	0	0			Identificare	2	6		
Tempestiva	0	0	1	1	Riconoscimento	0	1		
Tempestivi	0	0			Riconosciuto	0	0		
Tempestive	1	1			Riconosciuta	0	0		
Tempestivamente	0	0			Riconosciuti	0	0	3	7
Accessibilità	1	1			Riconosciute	0	0		
Accessibile	0	0			Riconosciutamente	0	0		
Accessibili	0	0	9	11	Riconoscere	3	6		
Accessibilmente	0	0			Integrazione	0	2		
Accesso	8	7			Integrazioni	0	1		
Accessi	0	3			Integrato	0	0		
Condivisione	0	0			Integrata	0	0	0	4
Condiviso	0	0			Integrati	0	0		
Condivisa	0	0	2	2	Integrate	0	0		
Condivisi	1	1			Integratamente	0	0		
Condivise	1	1			Integration	0	1		
continues on the other column					Total	25	42	25	42

Table. 1
Synoptic and comparative table of the results
from the content analysis

Prior to its final release, therefore, we consider it useful to include in Syllabus 1.5 references to transparency, now regulated by various laws in Italy specifically referring to the healthcare sector (see Legislative Decree no. 33/2013, article 41). Moreover, it would seem that this adjustment should be oriented (mainly) towards the availaibility of information systems towards the outside, as a 'system of information' [Carignani, 2004]. This observation also stems from the fact that in our opinion, the content analysis has returned positive results regarding the internal perspective, i.e. collaboration between information flows, processes and operators.

6.   Conclusions

With the development of computer science and business information systems, information processing, both within and outside the organizations, has become increasingly easier (in the sense of 'user friendly'), widespread and open. In particular, the introduction of the Internet (and the associated solutions of intranet and extranet), with the subsequent development of web 2.0, has actually changed the manner, purposes and in some ways, the 'styles' of using data, information and knowledge, especially in business contexts. IT innovations, moreover, very often become over time, genuine social innovations (e.g. home automation, smartphones and social networks), especially in areas where the human element is prevalent. In this sense, the one sector of maximum relevance is without a doubt the health sector, whose services are by definition, oriented to producing the most human driven of resources, i.e. health. Such technological and sociological combinations need to be constantly informed nowadays of 'values', either in terms of social responsibility, norms or prospects of improvement (efficacy, efficiency and economicity). Among these values, transparency occupies an important role today, especially in the health sector and also in economic terms, in order to ensure sustainability for future generations [Kotler et al., 2010].

In our study, we have considered health transparency from a multidimensionality perspective, theoretically investigating a possible reconstruction of its 'values' to propose an overall framework, in order to highlight the applications from an economic, business and social point of view. Our study, a conceptual paper, has thus focused on the dynamics that generates transparency starting from health service computerization, examining the functioning of healthcare environments, markets and enterprises in the perspective of information management and communication in health, arriving at the definition of a potential principle of transparency for the design of health information systems.

In addition, with reference to ECDL Health, the professional certification in health informatics for which in Italy AICA is responsible, we have also carried out a content analysis on versions 1.1 and 1.5 of the Syllabus, in order to verify the attention addressed to the transparency of health information systems. The survey results are uneven: a direct reference to transparency is lacking in both versions, but there are numerous references to specific 'attributes' of transparency, especially in a strictly computer science sense. There are therefore potential margins of development for the new Syllabus by virtue of a) the recent changes in Italian law, b) the necessity for further openness on the part of healthcare enterprises towards comparison and evaluation processes, and c) the ever-increasing demands, by citizens and operators, for information, participation and commitment.

In conclusion, the content analysis was carried out on a 'desirable' corpus of concepts, knowledge and skills in the field of health informatics, to ascertain the extent to which effective competences, skills and attitudes are practiced and evolve in the routines of health enterprises. A more transparent healthcare organization, based on more transparent health information systems, constantly

provided with appropriate mechanisms for information security [Carignani and Rajola, 2010; Festa and Teti, 2010], represents nowadays a real business 'attractor', certainly in the perspective of the economic value to be generated (due to greater efficacy and efficiency), but especially in the perspective of human, social and civil values, inherent in the health needs of individuals and populations.

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