

HOW DOES INFORMATION SYSTEM SUCCESS COME ABOUT IN INTER-ORGANIZATIONAL NETWORKS OF PUBLIC SERVICES?

Research full-length paper

Track N° 2

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Abstract

The paper investigates how information systems in inter-organizational networks can be improved over time. The paper focuses on home care services for elderly people. DeLone and McLean's conceptual model of information system success was used to understand changes in the quality of the case study information system. The analysis highlights the importance of the governance of information systems at the inter-organizational level.

KEYWORDS: *Governance; information system success; information quality; long-term care services; public service networks*

1 Introduction

In recent years, public administrators have found themselves having to digitize information and to be responsible for information flows in new contexts. This is the result of the growing involvement of new actors in the provision of public services, and the establishment of new inter-organizational networks.

In the specific case of social health services networks (such as integrated home care), each public administration (healthcare authorities/municipalities) and each private organization involved (profit and nonprofit) will have its own information system. These entities are involved in the ‘production’ phase of information (supply side) and can be information users (demand side) in decision-making processes (Bouckaert and Halligan, 2008, pp. 113–117). It follows that, in the context of social and health networks, it is vital to integrate various organizations’ information systems (and processes).

We analysed the quality of information systems supporting social healthcare services networks. It is important to note that ‘a central question to any IS evaluation involves understanding what we mean by “the system” and being clear about the nature, scope, and boundaries of the evaluation. Sedera suggested that, as the first step in every IS success study, researchers must explicitly specify the type of system/application that they are evaluating and develop appropriate approaches and measures’ (Tate, Sedera, McLean and Burton-Jones, 2014, p. 1237).

We focused on a network of integrated home care services for non-self-sufficient older people (65+ years old) in terms of the need to ensure ‘good governance’ of such networks, i.e. the production and transmission of quality information to support decision-making, executive and control processes (Jennings, Ewalt, 1998).

After Italy’s last welfare reform (Law No. 328/2000), Italian regions became the main co-ordinators of the welfare and healthcare policies in their geographical area. According to Provan and Milward (2001), the regions perform the role of the network administrative organization, which ‘acts as both

the agent of the community, ensuring that needed services are provided, and the principal of the network participants, monitoring, co-ordinating, and funding their activities' (2001, p. 418).

Under the co-ordination of the regional government, municipalities in Italy are responsible for local welfare care (the so-called 'local' welfare area), while health organizations provide health services to 'health districts'.

The Porta Unica di Accesso (PUA) is an important integration mechanism in networks of social and healthcare services. It is a one-stop shop to which older people and/or their families apply to request long-term care services. The PUA is responsible for giving information to citizens about their rights and opportunities, for understanding users' needs, and for acting as a 'filter' for citizens' requests. The PUA performs front-office and back-office activities with local government and health district employees collaborating.

The Unità di Valutazione Multidimensionale (UVM) is another important integration mechanism. It is a 'multidimensional evaluation unit' composed of physicians, healthcare and social care professionals who are responsible for an indepth appraisal of the needs of older people who have demanded long-term care, when the PUA considered them eligible—at first sight—for integrated home welfare/healthcare services.

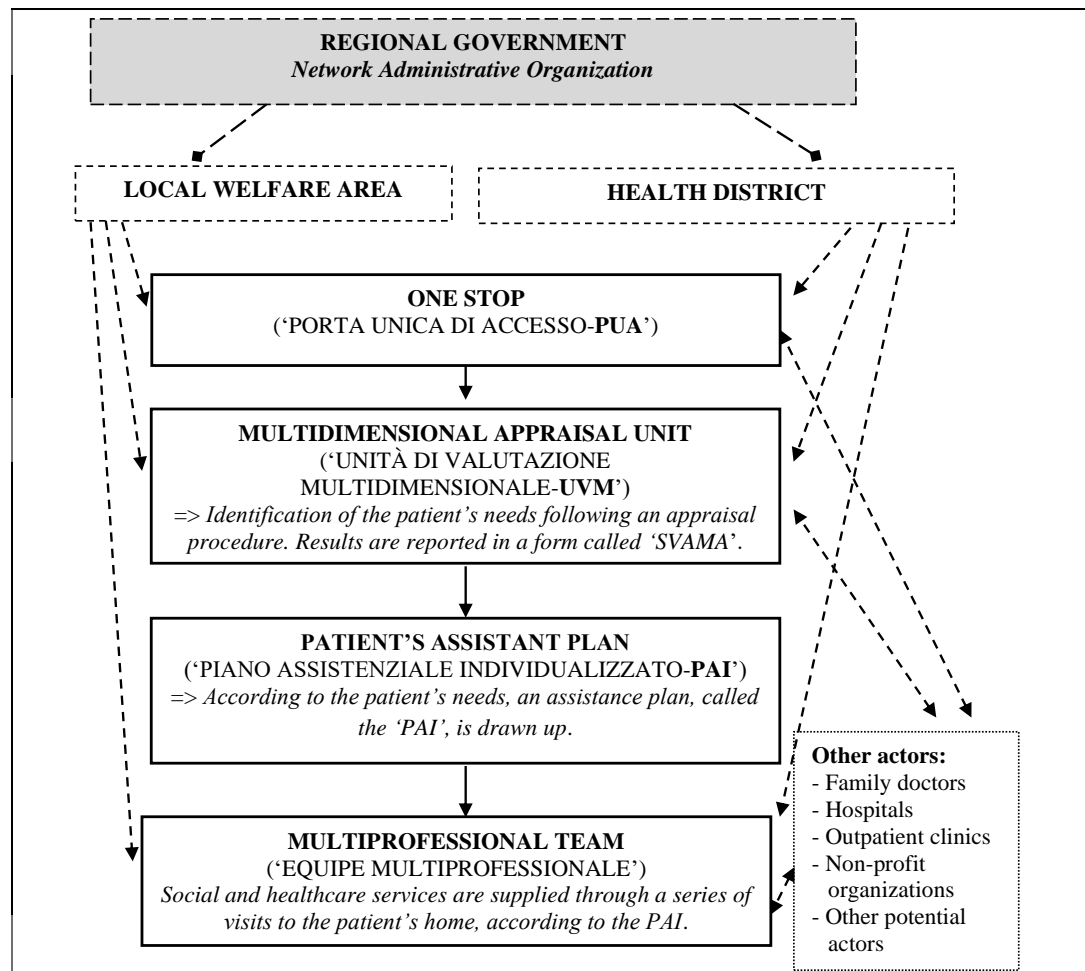


Figure 1. The network of integrated home care services for older people in Italy.

The identification of a patient's needs follows an appraisal procedure. The output of this procedure is a report called the 'Scheda di Valutazione Multidimensionale' (SVAMA). According to the patient's needs, an assistance plan, called the 'Progetto Assistenziale Individualizzato' (PAI) is drawn up by the UVM. The PAI clarifies a specific package of welfare and healthcare services for each patient, together with the objectives of their clinical/assistance path.

Finally, a multiprofessional team (the Equipe Multiprofessionale) supplies social and healthcare services at the patient's home through a series of visits during the period identified in the plan.

The network of integrated home care services for the elderly is shown in Figure 1.

After selecting a case study, we tried to understand 'what' was proposed over time to gradually improve the quality of information at the overall level of the network and the reasons for those choices.

The network of integrated home care services we examined was in the province of Lecce and had dealt with the issue of the quality of information systems at the network level. The network was located in the Apulia region, which has implemented an ambitious, complex and extensive computerization project of its regional health services over the past 15 years.

Our findings increase our knowledge about the factors that guarantee that an information system will be successful in the context of a public services network. Our results also provide additional assessment elements not only for the management of municipalities and health districts to improve their flows of information, but also for regional health and social care public managers by virtue of the role of the network administrative organization (Provan and Milward, 2001, p. 418).

2 Literature review

As part of a study of management of information systems, DeLone and McLean published one of the seminal works in the field in 1992 and subsequently revised it in 2003. Taking a cue from the results of some pioneering works (Mason, 1978; Shannon and Weaver, 1949), DeLone and McLean thought that the quality of an entity's information system should be measured by observing the entire process of information development—from the production phase to the transmission and use of data to the measurement of the possible effects (positive and/or negative) on the individual and organization's performances. Figure 2 illustrates DeLone and McLean's model, which is based on the following dimensions:

- The quality of the information system and, in particular, of the 'process of production and transmission' of information. In this case, the emphasis is placed on questions of a technical nature that pertain to the methods of managing the database and transmitting information.
- The quality of information, i.e. the output produced. In such circumstances, it is a question of examining whether the information available presents certain characteristics, such as accuracy, comprehensibility, timeliness, etc.
- The 'quality of service', i.e. the phases of the process of collecting, processing and transmitting information that depend on the actions of service providers (IT department or organization) which make resources available (databases, storage spaces, network connections) for the benefit of information users.
- The actual use or intended use of the data. The choice between these two survey options depends on the purpose of the research.
- User satisfaction: recipients of the information flows are invited to express their opinions on various aspects pertaining to the quality of the information transmitted to them.
- A comparison of the advantages and the costs connected to the use of the information flows (net benefit).

The model has the advantage of setting up the various quality measures and identifying the logical and causal links between the various dimensions observed.

This is a widely-accepted theoretical framework for the management of information systems studies and—among other models for assessing information systems (Isaias and Issa, 2015: 121–140)—it is still valid (Petter, DeLone and McLean, 2012; DeLone and McLean, 2016).

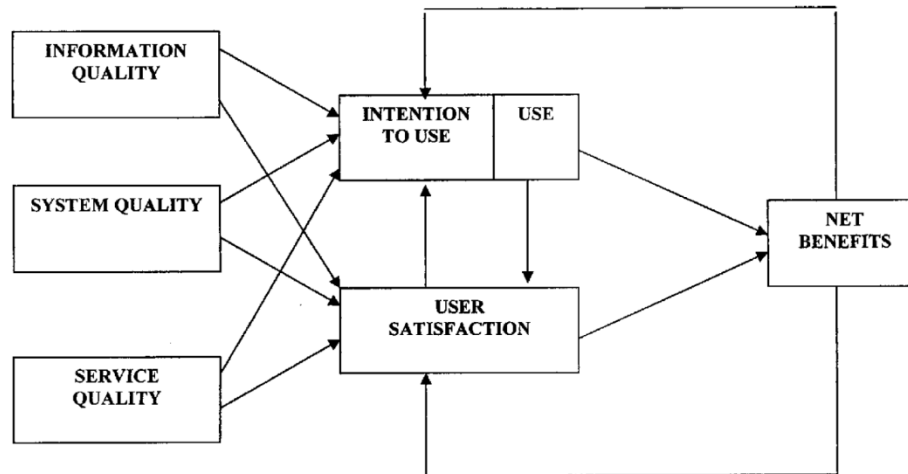


Figure 2. DeLone and McLean's model for measuring the quality of an information system.

At a conference in 2011: 'the panelists proposed a new research agenda for information systems success research. The DeLone and McLean IS Success Model has been one of the most influential models in Information Systems research. However, the nature of information systems continues to change...improved understandings of theory and measurement offer new opportunities for novel approaches and new research questions about information systems success' (Tate, Sedera, McLean and Burton-Jones, 2014, p. 1235). In particular, they highlighted the need for 'process theories that examine the motors of change over time. Rather than simply taking a snapshot of an information system, as in a cross-sectional survey, we should be developing success narratives. To do this, we need to understand how information systems success comes about. How can success be developed or selected over time? Can it be sustained? What are the motors of change?' (Tate, Sedera, McLean and Burton-Jones, 2014, p. 1242).

In order to analyse the 'enabling factors', i.e. the factors that allow an information system to function correctly (in terms of system quality, quality of information, quality of service, use levels of information flows, satisfaction levels of recipients and impacts related to use), the literature on management control systems provides insights into using information systems measure organizational and individual performance (Anthony, 1965; Anthony and Govindarajan, 1995; Chenhall, 2003; Coda, 1988; Lebas and Weigenstein, 1986; Maciariello and Kirby, 1994; Macintosh, 1994; Otley, 1987; Simons, 1995).

The implementation of a performance measurement system requires the procedures to be followed for data collection and processing to be defined (Hatry, 1999, 2006; Poister, 2003: 27).

With particular reference to the literature on public sector performance management, one of the most important works is Bouckaert (1993). Bouckaert said that the measurement of performance is not just a technical issue, in the sense that it is not sufficient that the information collected, processed and transmitted is 'valid', i.e. conforms to certain standards or meets specific needs. Respecting the conditions of 'functionality' and 'legitimacy' of the measurement system is also necessary.

Interestingly, factors such as the political and administrative 'commitment' to the topic of information quality, the 'user involvement' in the selection of relevant information and the 'staff skills' for upload-

ing/processing data are ‘causes of the success’ of an information system (DeLone and McLean, 2003) and enhance meaningful management (Bouckaert, 1993). A more recent study on information system success reached similar conclusions (Petter, DeLone and McLean, 2013).

However, studies on the quality of information have focused on specific organizations and not on public services networks in which several (public/private) organizations are responsible for specific activities. This is an important omission considering the relevance that the network organizational model has assumed in recent years.

In the specific case of social health services networks (such as integrated home care), the public and private providers involved will all have their own information systems (Yusolf, Paul and Stergioulas, 2006). These organizations are involved in the ‘production’ phase of information (supply side) and can be information recipients in decision-making processes (demand side) (Van Dooren, 2006).

Therefore, in the context of social health services networks, the problem of integrating providers’ information systems (and processes) into a network is very important (Kodner and Kyriacou, 2000; Vázquez et al., 2015). It is not only a matter of ensuring the quality of the information systems of each organization involved in the network but also of guaranteeing the quality of the information supporting the network as a whole.

However, the literature on public networks, in general, and on social health services networks, in particular, does not offer additional elements which help to clarify the factors, i.e. the ‘enabling conditions’, for the success of an information system in the particular context of a service network.

In light of these considerations, we analysed the quality of information systems supporting social health services networks in order to better study the ‘motors of change’.

3 Methodology

A qualitative (rather than quantitative) approach was more useful for our research (Yin, 2014) because the activation of integrated home care services networks is a fairly recent phenomenon. After selecting a case study, we tried to understand ‘what’ had been proposed to improve the quality of information and the reasons for those choices (Stebbins, 2001).

The network of integrated home care services we examined was in the Apulia region in the province of Lecce, which had implemented an ambitious, complex and extensive computerization project of its regional health service. The experience of the Apulia regional information system is unique in Italy and has influenced the organizational and management decisions taken by the local health authorities and the Apulia welfare areas in relation to their entity information systems.

The Apulia region had made the ‘Edotto’ information system available to operators in their social health sector (local health authorities, hospitals, territorial social areas, physicians/paediatricians, accredited private entities) for monitoring integrated home care services. It also issued a series of guidelines defining common tools and procedures for the management of the various events of integrated home care services in the regional territory (taken-in load, evaluation, disbursement, suspension, re-evaluation, conclusion of the service).

We examined the organizational and management solutions developed by the local health authority and municipalities of the province of Lecce in order to improve the quality of information for supporting decision-making, executive and control processes. The network involved many small municipalities (97 entities) and 10 social health districts belonging to the same local health authority. The number and variety of organizations involved made information management within the network particularly complex.

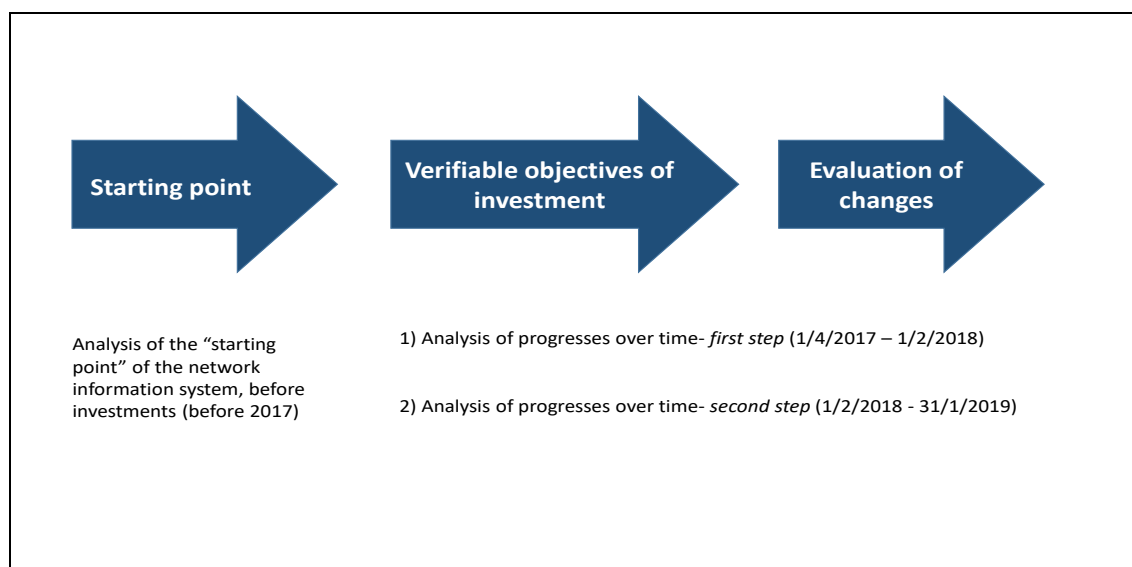


Figure 3. The key steps of the IS analysis of the network of home care integrated services.

Figure 3 illustrates the steps of the case analysis. The analysis began with an examination of the starting point of the network information system (the period before 2017). We studied national and regional legislation, the local health authority’s internal procedures, and the planning and reporting documents (social plans) from the local geographical welfare area.

Next we studied the network’s information system by interviewing the managers of Lecce’s local health authority. The interviews focused on the main aspects that characterized a high-quality information system, taking into account the suggestions from the literature analysis. Specifically, we analysed the various dimensions of the quality of an information system identified in DeLone and McLean’s conceptual model: the quality of data, the quality of the information system, the quality of service, and the use of information, the users’ satisfaction and net benefits.

We also analysed data quality (the output of the information system) on the basis of Wang and Strong’s conceptual model, with regard to the characteristics that data should possess in order to be judged on quality, accessibility, flexibility, validity (Lee, Strong, Kahn and Wang, 2002). Wang and Strong focused on the information quality (IQ), i.e. the output from information systems. They based their methodology, first of all, on a model of interpretation of the concept of information quality which was called the ‘product and service performance model for information quality’ (PSP/IQ model).

Following Lee, Strong, Kahn and Wang (2002), after identifying the quality factors of an information system’s output (overall, we identified 15 characteristics), we moved on to monitoring the quality of the information in an inter-organizational context. The analysis highlighted the critical issues and strengths of the information system and could therefore be useful for identifying improvements made over time.

After analysing the quality of the information system, i.e. the ‘dependent variable’, we moved on to study the factors that ‘cause’ quality, i.e. analysing the ‘independent variables’. Here we used the results of Bouckaert’s work (1993) and the findings of Petter, DeLone and McLean (2008, 2013, 2016).

The analysis of documents and the interviews we carried out allowed us to examine the computerization level of the processes of collecting, processing and transmitting information within the network under study and the paths subsequently undertaken to improve the quality of the information system reported to the network as a whole.

In sum, after examining the ‘starting point’ (before 2017), we analysed the objectives of investments made (2017) and evaluated the changes over time (2018–2019).

4 Measuring the quality of the network information system at the ‘starting point’

Before analysing the innovations implemented, we described the starting situation of the network information system in use in the Apulia region, consisting of Edotto (the regional information system) and the information systems used by the local health authority and municipalities in the local welfare area of the province of Lecce. Our study used document analysis and interviews with the Lecce local health authority’s general manager and chief information officer. We considered the following aspects: the governance of the network information system; the quality of the information available to the network; the quality of the network information system; the quality of the network’s data management service; and the effective use of information and its benefits.

4.1 Governance of the network information system

We asked the local health authority’s information system manager to describe the starting situation of the network information system before the province made their initial investment. First, we asked him to clarify the governance of the information system and, in particular, to specify ‘people (internal and/or external to the organization) responsible for collecting, uploading, processing and transmitting data related to the different phases of the integrated home care services (taking charge, disbursement, suspension, re-evaluation, conclusion)’. He told us that there wasn’t a single framework—at the network level—for the distribution of responsibilities because for several years there had been several organizational and operational scenarios within the same local health authority (among the various social health districts) and because there were different methods of carrying out the integrated home care services in the 10 local welfare areas. According to the manager, paradoxical situations had arisen that had led to different ways of taking care of and assisting the users, which had repercussions on the distribution of responsibilities for collecting, loading, processing and transmitting data. In fact, in several circumstances, the distribution of responsibilities was unclear and did not translate into consequent actions.

The manager of the information system also answered the following related questions:

- The organization has adopted guidelines/regulations governing the collection, uploading, analysis and transmission of data.
- The guidelines/regulations governing the collection, uploading, analysis and transmission of data are constantly applied within the organization, also by virtue of periodic checks on compliance levels.
- As part of the agreements signed between the local health authority and the local welfare areas, common rules are defined for managing and sharing data.
- The duties and responsibilities of those (internal or external to the organization) who ensure the quality of data in the various stages of collection, loading, processing and transmission are clearly defined.

The manager told us that, in the past, the 10 health districts in the Lecce local health authority and the corresponding local welfare areas had not provided any guidelines/regulations governing the collection, uploading, analysis and transmission of data and, therefore, the local health authority and the local welfare authorities had never had to verify the adoption of these guidelines/regulations by individual operators. Moreover, the authorities had not defined any common rules for the management and sharing of data between the health authority and local welfare areas.

The individuals responsible for data quality assurance were not identified—at the network level—and their tasks and responsibilities were not defined. Each organization involved in the network was concerned only with complying with the government’s information requirements connected to sending of data through the regional Edotto system, without addressing the issue of data quality at the network level as a whole. We should emphasize that, for about 15 years, the Apulia region had equipped itself

with the Edotto information system, through which, among other things, mandatory information flows had to be transmitted for monitoring the integrated home care services. Therefore, the health districts (for health services) and the local welfare areas (relative to social benefits) were required to periodically upload data about the services carried out at patients' homes onto the Edotto system. This reporting activity was a prerequisite for health districts and local welfare areas to obtain remuneration corresponding to the services provided.

Ultimately, according to the manager, the overall governance of the network information system was inadequate. This situation had three negative consequences on the integrated home care services, specifically, 'the patients are on average confused on what is happening; sometimes, we cannot detect the real activity that takes place; we fail to receive the corresponding remuneration of the service carried out because, sometimes, we cannot prove what we do'.

Tables 1–4 illustrate the quality of information available to the network; the quality of the network information system; the quality of the network's data management service; and the effective use of information and its benefits. The tables rank the importance of each feature (0 = minimum to 10 = maximum), and a description is given of the main reasons for success/failure.

Features	Score (min. 0; max. 10)	Description of the main reasons for success/failure
Accessibility	5	There is no widespread computerized data management; therefore data are not registered by means of electronic solutions but on paper.
Correctness	5	The measures contain some errors, such as wrong or unreported figures, and they can be manipulated.
Flexibility of use	2	The information system does not allow data to be easily aggregated and, in any case, it allows processing of only few data.
Timeliness	2	The insufficient level of computerization of data collection/uploading negatively impacts on timeliness.
Completeness	5	Not all the basic data are counted. For example, during the meetings of the Multidimensional Evaluation Unit, the contents of the discussions are reported, but they are not sufficiently detailed.
Relevance	7	The data reported are significant but not sufficient for programming, managing and controlling services.
Security	2	Information is reported on archives and not on storage. There is no reserved access to the archives.

Table 1. *Quality appraisal of information available to the network.*

Features	Score (min. 0; max. 10)	Description of the main reasons for success/failure
Integration of the database at the network level	3	Until now, the Lecce local health authority and the municipalities belonging to the local welfare areas have not adopted a software to manage the various phases of the supply process, but they have adopted the regional Edotto system to transfer mandatory data. The network of home care services cannot share data referring to the same patient.

Table 2. *Quality appraisal of network information system.*

Features	Score (min. 0; max. 10)	Description of the main reasons for success/failure
The management software used for gathering, uploading, processing and transmitting data allows the various operators to access information at any time and place	5	The regional data management service of the network (Edotto) responds only to administrative information needs of the Apulia regional government. Data can only be loaded only from enabled workstations so it can't be loaded at patients' homes.

Table 3. *Quality of the network's data management service.*

Features	Score (min. 0; max. 10)	Description of the main reasons for success/failure
Effective use of data	5	The information available is not used to carry out concurrent control because the loading of data into Edotto is often late. Therefore, a patient's updated information cannot be acquired in real time. Management uses data for accountability reasons (to respond to the administrative needs of the region) and not for learning purposes.
Net benefits	4	The integrated vision of social and healthcare services being provided to older people has not been achieved.

Table 4. *Effective use of information and its benefits.*

5 Progress over time: investments made

We asked the Lecce local health authority information system manager whether: 'The quality of data, for the purposes of effectively monitoring the integrated home care services, is a priority for the organization and if the general manager supports the processes to improve the network information system'. He said that the Lecce local health authority general manager, as well as the management of the 10 local welfare areas, were highly committed to having quality information about home care services. Therefore, the Lecce local health authority and local welfare areas had made—not without difficulty—the necessary investments to strengthen the network information system.

The Lecce local health authority has taken a leading role in the improvement process, co-ordinating actions in its 10 health districts with the local welfare areas in the 97 municipalities. In particular, the Lecce local health authority implemented new software to manage its integrated home care services, provided in cloud computing mode (according to the 'platform as a service' model) through a special platform that can be accessed online from any location to compile a 'social health record' for each patient. Some local welfare areas also opted for cloud computing for their social health records.

The Lecce local health authority invested 79,000 euro over two years to buy a software licence for the whole network (PUA visits and patients' home registrations). Moreover, the local health authority in-

vested about 12,000 euro over three years to rent tablets for the operators of the multiprofessional teams that were supplying social and healthcare services directly to the patients' homes. This solution allow operators to transfer data in real time without any delays.

6 Progress over time: first step (April 2017 to February 2018)

The first improvement step that the Lecce local health authority (with the related health districts) and some associated municipalities took was to enhance their information systems, ensuring compatibility with the regional Edotto system, in order to guarantee the transmission of the mandatory information flows to the Apulia regional government and the ministry of health.

The Lecce local health authority implemented the new software to manage its integrated home care services, and some of the local welfare areas utilized the same solution.

Table 5 illustrates—with reference to the 10 health districts and the corresponding local welfare areas—the number of times the common ICT platform was accessed (first column) by PUA gatekeepers to manage citizens' requests for integrated long-term care services during the first period (from 1 April 2017 to 1 February 2018). Only in some geographical areas was the access number significant. In other areas, access number was very low, because the health districts and municipalities had not integrated their processes.

In the first period, the UVMs rarely used a common information system to transfer their SVAMA reports (see the second column in Table 5). Similarly, the multiprofessional teams rarely used the integrated software to collect and manage patients' data (third column in Table 5).

Healthcare districts/local welfare areas*	Number of times the common ICT platform was accessed by PUA gates (one-stop shop) to manage citizens' requests	Number of reports (SVAMA) transmitted by UVM to the regional government through the common ICT platform	Number of times the common ICT platform was accessed by members of multiprofessional teams during their visits to patients' homes
A	15	1	554
B	2,430	193	1
C	190	8	1,007
D	134	1	633
E	112	5	928
F	6	21	299
G	164	33	916
H	3,355	1	2,110
I	2	0	606
J	0	1	2
Total	6,408	264	7,056

Table 5. *The number of times the network's ICT platform was accessed during the first period (from 1 April 2017 to 1 February 2018).*

**For privacy reasons, the districts/local welfare areas are identified with a letter (from 'A' to 'J').*

In the first improvement step, we looked at the tools used for collecting and transmitting patients' data (social health records) from their homes. However, the new ICT solutions (hardware and software) did not lead to much improvement. Data needed to be integrated at the start of the supply process, in particular patients' requests (PUA access) and when a UVM carried out an evaluation of needs. All of the local welfare areas in the province of Lecce should have adopted the same solutions (responsibilities, processes and technologies) to integrate health and social care services in the region.

7 Progress over time: second step (February 2018–January 2019)

The Lecce local health authority, with its 10 health districts, and the corresponding local welfare areas realized that they needed to improve co-ordination and signed an agreement 'for integrated home care service management'. The agreement was to 'standardize the process of providing the integrated home care service on the territory'. The agreement defined the responsibilities of the various actors in the network. The main co-ordinating mechanism was the standardization of the processes of taking charge, evaluation and management. The agreement clarified the governance of the network information system, i.e. the rules to be followed and the responsibilities to be assigned to the various operators involved in the process of providing data for the integrated home care services as a whole. It defined 'who does what' to oversee the processes related to the activities of collecting, processing and sending data.

The manager of the information systems of the Lecce local health authority told us that, in the past, the 10 health districts and the corresponding local welfare areas had not provided guidelines/regulations governing the collection, uploading, analysis and transmission of data and, therefore, the local health authority and the territorial areas had not had to verify individual operators' adoption of these guidelines/regulations. Moreover, the health authority and the welfare areas had not defined any common rules for data management and sharing.

The agreement clarified the 'governance of the information system' and aimed to favour the 'institutional co-ordination' of the various organizations involved in the network.

Table 6 illustrates—with reference to the 10 health districts and the correspondent local welfare areas—the number of times the software was accessed (first column) by the one-stop shops (PUAs) during the second period (from 2 February 2018 to 31 January 2019). The number of times the system was accessed electronically significantly improved (up by 162%).

The UVM adopted a common information system to transfer the SVAMA more frequently because the utilization of the common platform improved (+297% from 264 to 1.049 times accessed) (second column). Moreover, the number of times multi-professional teams accessed the system to collect and manage patients' data increased significantly (+500%, from 7.056 to 42.950) (third column).

Healthcare districts/local welfare areas	Number of logons to the common ICT platform by PUA gates to manage citizens' requests	Number of reports (SVAMA) transmitted by UVMS to the regional government through the common ICT platform	Number of logons to the common ICT platform by members of multi-professional teams during their visits to patients' homes
'A'	3,615	12	2,916
'B'	2,477	368	3,119
'C'	1,266	183	2,995
'D'	134	6	3,472
'E'	112	5	5,366
'F'	203	182	3,592
'G'	3,549	270	8,296
'H'	5,451	20	1,047
'I'	6	2	4,014
'J'	1	1	8,133
Total	16,814	1,049	42,950

Table 6. The number of times the network's ICT platform was accessed during the second period (from February 2018 to January 2019).

8 Discussion and conclusions

Our study focused on the quality of information systems supporting social health networks for the provision of integrated home care (long-term care) services. We analysed the organizational and management solutions developed by the Lecce local health authority and the municipalities belonging to the corresponding local welfare areas to improve the quality of their shared network's information system in terms of providing data for supporting decision-making, executive and control processes. From the analyses we carried out, some critical issues emerged in the information system supporting the network.

We analysed the information system in light of the literature on management of information systems and public sector performance measurement and management. In particular, DeLone and McLean's conceptual model (1992, 2003) focuses on the quality of the information system, and defines the scope of measurement of this dependent variable (information quality factors, hardware and software features of the instrumentation, quality of service, use of data and expected benefits). DeLone and McLean pointed out that there were factors that 'cause quality' and that therefore constitute the independent variables, for example the top management's commitment and the involvement of the users of information in the process of identifying performance measures.

Our case study showed that, in the context of the network, the governance of the information system constitutes a further 'independent variable' that is extremely important. The Lecce local health authority invested substantial time and resources in order to improve its information systems: in particular, collecting data about patients during the home care process, with a digital social health record tool. Some of the local welfare areas in the province of Lecce had adopted the same ICT solutions used by the Lecce local health authority to improve their own information systems. Both the local health authority and the local welfare areas were equipped with the same software for the management of the

social health records, to be used in the cloud mode, to facilitate access by social health professionals from any internet workstation (including from a patient's home). The digitization of the social health record was a significant step forward in improving the quality of patients' information, because it reduced the time taken for the information to be available for decision-making, executive and control processes. Furthermore, the digital social health record improved the accuracy, completeness, security and flexibility of the available information—the software managing the digital record guided the operators during the data loading phase and prevented unauthorized access to the database.

However, the transition to the digital social health record did not solve the problem of integrating home care services between the various social health districts of the same local health authority, on the one hand, and between the districts and the local welfare areas, on the other hand. The collection, loading, processing and sending of service data was not clear about exactly 'who did what'. Therefore, the network needed to define the governance of its information system—the rules to be followed and the responsibilities of the various operators involved in the collection, loading, processing and sending of data.

Our independent governance variable had immediate repercussions on the quality of information output by the system. Once the governance of the information system was properly defined agreement was reached on the hardware and software tools to be used for gathering, processing and transmitting information in the various phases of the long-term care process. The governance agreement also affected the 'quality of service', because synergies emerged from the integration of the information systems of each organization in the network.

Figure 4 shows DeLone and McLean's model with the important addition of governance and its role in enhancing the quality of data at the network level.

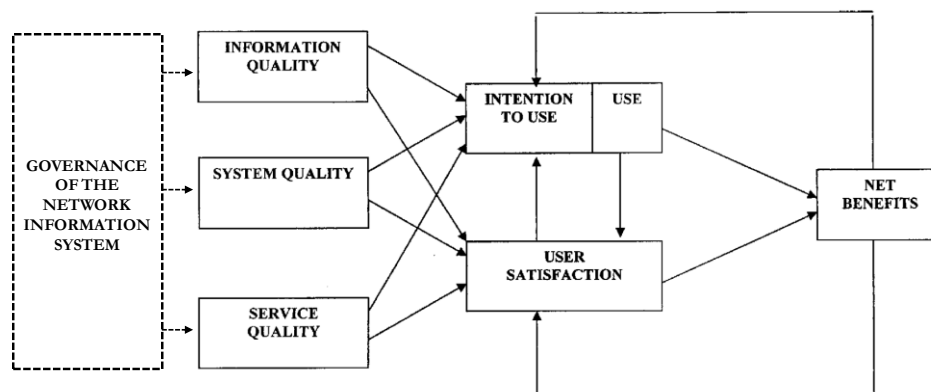


Figure 4. DeLone and McLean's model and the role of the governance of the information system, in the context of a network of services.

Our findings will help managers in municipalities and local health districts to improve their data flows. They will also be of value to local government managers who are responsible for social and healthcare services.

Our findings were based on only one area, so future studies comparing the performance of this area with other similar geographical contexts could be useful.

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