

CLASSIFICATION DOCUMENT: PROFILE ANALYSIS OF THE MIS/PACS SYSTEMS ADMINISTRATOR Basic University Degree First Level Master Second Level Master Certification paths

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By the Study Group:

"RECOGNITION OF THE ROLE OF THE SYSTEM ADMINISTRATOR"

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Abbreviations and acronyms

SA

System Administrator

RIS

Radiology Information System

MIS

Multidisciplinary Information System

DIS

Departmental Information System

PACS

Picture Archiving and Communication System

ICT

Information Communication & Technology

THPRP (PSTRP)

Technical Health Professions of Rehabilitation and Prevention

TSRM

Health Technician of Medical Radiology

TSLB

Health Technician of Biomedical Laboratory

OU

Operational Unit

NCBA

National Collective Bargaining Agreement

IS

Information Systems

RT

Radiotherapy

IGRT

Image Guided Radiotherapy

SGRT

Surface Guided Radiotherapy

Introduction

This document is the result of the careful analysis of organizational contexts and experience gained over the last fifteen years in the diagnostic imaging departments, the area in which digitization has contributed most to making the previously consolidated balanced dynamic, and to favoring the reengineering of flows and processes of taking charge that are more functional than the resources put in field.

The digital transformation has universally generated new needs, which have put in place the conditions for the familiarization with tools suitable for the progressive specialization of the experts involved in the front line, and not only this, but also in the management of amounts of data generated by the respective systems; this process involves the presence and the growing contribution required of Health Professionals in the management of information systems, and, as regards this document, in their application to the diagnostic and/or therapeutic field to which they belong.

Today's economic health context is characterized by the growing need to adopt policies of management of data oriented towards the emerging need to process this heritage in AI systems (Artificial Intelligence), while ensuring their confidentiality, also with respect to the risk of their fraudulent use: it is therefore essential to constantly keep the mapping of the skills of the professionals who are involved in the strategic management of ICT tools up to date.

In this scenario, the appointment of the System Administrator (hence shortened SA), or a figure assimilated by the Data Controller, must take place after the evaluation of the experience, capacity and reliability of the candidate, which means that the attribution of the role must be individual and include an analytical list of the areas of operativeness allowed on the basis of the designated authorization profile.

The focus of this document is developed through the path that led the radiological information systems (RIS) to evolve in the Multidisciplinary Information Systems (hereinafter abbreviated as MIS), which, in the field of diagnostic imaging, have in fact revolutionized the last fifteen years of history; RIS, developed in parallel with PACS systems (Picture Archiving and Communication System), gradually supported by the management of images coming from other disciplinary sectors, have evolved into real departmental systems (according to the substantial and not only organizational meaning of the term), and then into wide-ranging multidisciplinary systems, generating needs of functional kind that led to the revision of company balance and teams devoted to them.

This working group, which will be supported by the collaboration with stakeholders in the sector of interest, is currently constituted by the members of the AITASIT Board of Directors, by experts external to the organization, and by the members of the FASTeR technical-scientific committee.

This classification document implies the purpose indicated above, acting as a guidance with respect to bibliographic references bearing the declination of specific skills that the health professional who serves as System Administrator in any Health Organization should adopt, through necessary training and certification courses.

1. Legislative references and evidence: recognition of the role

The objective of this paragraph is the attempt to synthesize those references which, in the wider context of legislative development, have supported the progressive revelation and existence of an organizational need and, in fact, training need in the merit of the recognition of the SA role, an aim that is also licensable with respect to this document. Specifically, the "imposed" simplification of the document digression brings out those references that are going to define the areas of assignment of the role, with the prompt attention paid to operational contexts, and to the progressive narrowing of the field of action reserved for the health professional who intends to hold this position.

Having said that, the drafting of the regulations is characterized not only by an actual time progression, but also by the growing classification of them in terms of the professional profile and contexts of belonging, a choice that harmonizes with the growing awareness of how this attribution of the role presupposes the definition of a level of skills adequately considered not only acceptable, but also as a formal guarantor of quality levels oriented to continuous improvement. The system administrator was already required by the data protection discipline existing before the "Codice del 2003" (Code of 2003) that defined "*soggetto al quale è conferito il compito di sovrintendere alle risorse del sistema operativo di un elaboratore o di un sistema di*

banca dati e di consentirne l'utilizzazione"¹ (a subject to whom the task of supervising the operating system resources of a computer or a database system is conferred and to allow its use), given also the professional specificities aimed at data protection and security. However, the importance of the role of the System Administrator is stated for the first time by the Privacy Guarantor through the provision entitled "Misure e accorgimenti prescritti ai titolari dei trattamenti effettuati con strumenti elettronici relativamente alle attribuzioni delle funzioni di amministratore di sistema" of November 27, 2008.² (Measures and precautions prescribed to the controllers of the data processing carried out with electronic tools relating to the attributions of the system administrator functions).

In this provision the Guarantor, in the absence of common regulatory and technical definitions, identifies the need to better clarify the legislative decree 196/2003 and to define the role of the SA in order to regulate his/her activity, considering the delicate implications inherent in the protection of citizens' personal data as well as the legal aspects regarding their management. For these reasons, in 2008 the Guarantor defined the SA as «*una figura professionale dedicata alla gestione e alla manutenzione di impianti di elaborazione con cui vengano effettuati trattamenti di dati personali, compresi i sistemi di gestione delle basi di dati, i sistemi software complessi quali i sistemi ERP (Enterprise Resource Planning) utilizzati in grandi aziende e organizzazioni, le reti locali e gli apparati di sicurezza, nella misura in cui consentano di intervenire sui dati personali*» (a professional figure dedicated to the management and maintenance of processing systems with which the processing of personal data is carried out, including database management systems, complex software systems such as ERP systems - Enterprise Resource Planning - used in large companies and organizations, local networks and security apparatus, insofar as they allow to intervene on personal data). Therefore the SA, during the performance of his/her assignments, although purely technical, has a considerable impact of responsibility on company data and has a particular role and a certain professionalism on the operational level in the company. So the Guarantor defined the professional figures who, in various capacities, deal with the protection of personal data, also in the health sector, as being equivalent to the System Administrator function.

So, with this provision, the Privacy Guarantor intended to give importance, in the management system of the company privacy, to the role of the system administrator stating his/her importance and imposing on the data controllers technical and organizational security measures that provide for the selection of candidates on the basis of proven technical skills, the assignment to the selected subjects of suitable levels of company responsibility and the definition and implementation of technical supervision and control procedures on the work done. In fact, the experience, capacity and reliability of the person who has to fill the role of system administrator must be carefully evaluated, this person must be able to guarantee the full

¹ Art. 1, comma 1, lettera C-D.P.R. 318/99

(Art. 1, paragraph 1, letter C-D.P.R. 318/99)

² Provvedimento del Garante della Privacy del 27 novembre 2008: "Misure e accorgimenti prescritti ai titolari dei trattamenti effettuati con strumenti elettronici relativamente alle attribuzioni delle funzioni di amministratori di sistema": "[...] lo svolgimento delle mansioni di un Amministratore di Sistema, anche a seguito di una sua formale designazione quale responsabile o incaricato del trattamento, comporta di regola la concreta capacità, per atto intenzionale ma anche per caso fortuito, di accedere in modo privilegiato a risorse del sistema informativo e a dati personali cui non si è legittimati ad accedere rispetto ai profili di autorizzazione attribuiti [...]"

(Provision of the Privacy Guarantor of November 27, 2008: "Measures and precautions prescribed to the controllers of the data processing carried out with electronic tools relating to the attributions of the system administrator functions": "[...] the performance of the duties of a System Administrator, also following his/her formal designation such as responsible or in charge of the data processing, usually entails the concrete capacity, by intentional act but also by fortuitous event, to have privileged access to information system resources and personal data to which we are not entitled to access with respect to the assigned authorization profiles[...]")

compliance with the legislation on the protection of personal data, including the security profile. Moreover, always by the controllers, a specific assignment letter will be prepared, containing:

- Certification that the appointee has the characteristics required by law;

- Analytical list of the areas of operation requested and allowed on the basis of the assigned authorization profile;
- Indications of the at least annual checks that the Data Controller will carry out on the activities performed by the System Administrator;
- Indication that the appointment and the related name will be communicated to the staff and possibly to third parties in the ways required by law.

Characteristics and skills that were subsequently highlighted in the “*Linee Guida per l’Assicurazione di Qualità in Teleradiologia*” (“Guidelines for Quality Assurance in Teleradiology”), issued by the Istituto Superiore di Sanità in 2010, that mentioned the System Administrator of the Radiological Area, defined as “*la professionalità in grado di interagire con il medico radiologo, il fisico sanitario e il tecnico sanitario di radiologia per assicurare il buon funzionamento ed affidabilità dei sistemi per la trasmissione e l’archiviazione degli esami di Diagnostica per Immagini. È indispensabile che questa figura professionale possieda tutti i requisiti tipici di un gestore di sistemi informatici ma che conosca a fondo le strumentazioni utilizzate, dotato di profonde competenze interdisciplinari, di tipo tecnico-informatico, organizzativo, economico e legislativo, in materia di archiviazione dei documenti informatici e loro sicurezza, con esperienza diretta di radiologia, comprendendo conoscenze tecniche, anatomiche, di imaging ed organizzative del workflow del Dipartimento di Diagnostica per Immagini*”.

(The professional capable of interacting with the radiologist, the medical physicist and the radiology health technician to ensure the proper operation and reliability of the systems for the transmission and storage of the Diagnostic Imaging exams. It is essential that this professional figure possesses all the typical requirements of an IT system manager, who also knows the tools used, with deep interdisciplinary skills, of technical-IT, organizational, economic and legislative kind, regarding the filing of computer documents and their safety, with direct experience of radiology, including technical, anatomical, imaging and organizational knowledge of the workflow of the Diagnostic Imaging Department).

Due to these assumptions and the progressive and increased awareness, in terms of responsibility, of making the processing of data inalienable by those who deal with them due to a designated assignment, the relevant references that can be found in the personal Data Protection Code must be reported, modified by the decree of adaptation to the GDPR⁴: even if there is no substantial reference to the figure of the SA in the process of data processing and retention, in this last reference there’s an implicit reference to the role for intrinsic specific technical skills, when it is necessary to entrust it to the data controller and/or the possible manager, in order to implement technical measures useful to guarantee a level of safety appropriate to the risk⁵ and above all proceduralized according to an obligation principle to which the respective conduct must be adapted.

Article 24 of the GDPR also establishes that “*Tenuto conto della natura, dell’ambito di applicazione, del contesto e delle finalità del trattamento, nonché dei rischi aventi probabilità e gravità diverse per i diritti e le libertà delle persone fisiche, il titolare del trattamento mette in atto misure tecniche e organizzative adeguate per garantire, ed essere in grado di dimostrare, che il trattamento è effettuato conformemente al presente regolamento. Dette misure sono riesaminate e aggiornate qualora necessario*”

(Taking into account the nature, the scope, the context and the purposes of the data processing, as well as the risks having different probabilities and seriousness for the rights and freedoms of the natural persons, the data controller implements adequate technical and organizational measures to guarantee, and be able to demonstrate, that the processing is carried out in accordance with this regulation. These measures are reviewed and updated when necessary);

the data controller, in the Italian context,

³Decreto Legislativo 30 giugno 2003, n. 196: "Codice in materia di protezione dei dati personali"¹ (Legislative Decree of June 30, 2003, n. 196: "Code regarding the protection of personal data")

⁴Decreto Legislativo 10 agosto 2018, n. 101: “Disposizioni per l’adeguamento della normativa nazionale alle disposizioni del regolamento (UE) 2016/679 del Parlamento europeo e del Consiglio, del 27 aprile 2016, relativo alla protezione delle persone fisiche con riguardo al trattamento dei dati personali, nonché alla libera circolazione di tali dati e che abroga la direttiva 95/46/CE (regolamento generale sulla protezione dei dati)” (Legislative Decree of August 10, 2018, n. 101: "Provisions for the adaptation of the national legislation to the provisions of Regulation (EU) 2016/679 of the European Parliament and of the Council, of April 27, 2016, on the protection of natural persons with regard to the processing of personal data, as well as the free movement of such

data and repealing Directive 95/46/ EC - General Data Protection Regulation”)

5Art. 32 del Regolamento: le procedure tecniche citate – quali la cifratura dei dati personali, il loro tempestivo ripristino in caso di incidenti fisici o tecnici e le verifiche periodiche delle misure tecniche ed organizzative adottate – lasciano intravedere una necessaria partecipazione di personale specialistico esperto nella gestione e nella trattazione informatica dei dati personali, così come la necessità di un suo intervento tecnico sin dalle fasi di progettazione e protezione dei dati

(Art. 32 of the Regulation: the mentioned technical procedures - such as the encryption of personal data, their timely restoration in case of physical or technical accidents and the periodic checks of the technical and organizational measures adopted –hint at the necessary participation of specialised personnel experienced in the management and computer processing of personal data, as well as the need for their technical intervention from the phases of design and data protection)

can therefore count on the collaboration of the system administrator, who, while fulfilling the obligations established by the Guarantor, in fact implements those appropriate technical and organizational measures. A further element that deserves to be mentioned in this document is the important pressure for reform supported by the Codice dell'Amministrazione Digitale (Digital Administration Code) and by the related reform legislative process about it: the progressive rationalization of the contents, supported by the simplification of the vocabulary and of the expected regulatory processes, promotes a natural process of enhancement of public information assets, by linking them to the institutional purposes of each administration.

Subsequently, with the 2016 law proposal containing the “Disposizioni per favorire la diffusione della teleradiologia e semplificazione delle procedure relative all’installazione delle apparecchiature a risonanza magnetica”⁷ (Provisions to encourage the dissemination of teleradiology and the simplification of the procedures relating to the installation of magnetic resonance equipment), there is the first legal explanation of the opportunity to attribute to health experts afferent to the technical area, in this case the Medical Radiology Technician, the function of SA “in area radiologica”⁸ (in the radiological area), which suggests the possible formalization of the assignments possibly formalizable with a view to development, first regulatory and then contractual. In this regard, in 2017 AITASIT draws up the Document “Riconoscimento formale e inquadramento retributivo per attività di Amministratore di Sistemi RIS/PACS” (Formal recognition and remuneration classification for the activities of the RIS/PACS Systems Administrator), with the intention of sharing the fundamental methodological and regulatory aspects in the act of allocating the attribution of the role in specific sectors and the respective contexts of reference: specifically, the working group in charge stated its position on the merits of both the opportunity to enhance the SA expressly appointed by the reference Company, and the plausible organizational repercussions from the harmonization of these assignments at the level of decentralized bargaining policies.

With no further respective considerations that would be the conclusions of the previous reference, the important contribution offered by the signing of the last Contratto Collettivo Nazionale di Lavoro del Comparto Sanità (National Collective Bargaining Agreement of the Health Sector – NCBA) must be mentioned, relating to the 2016-2018 Period, which acts as a forerunner regarding the proposal for the definition and reformulation of the legal and economic treatments, plausibly object of interest for human resources; although we know the sphere of competence of this agreement, with respect to what is delegated to the respective decentralized bargaining, it is extremely interesting to highlight the relative possible organizational repercussions that act as a corollary to the intrinsic dynamics of the incentive system.

An innovative element of the new NCBA is the chapter dedicated to the function assignments⁹, important organizational roles assigned to professionals who meet the necessary requirements for the participation in any selections called by the companies; depending on the role played, these assignments include the performance of functions with great responsibility or functions that are more complex than those normally carried out in one’s own profile and category, substantially we distinguish two macro-categories, “organizational” and “professional”.

⁶ Istituito con il Decreto Legislativo 7 marzo 2005, n. 82, il CAD è stato successivamente modificato e integrato prima con il decreto legislativo 22 agosto 2016 n. 179 e poi con il decreto legislativo 13 dicembre 2017 n. 217 per promuovere

e rendere effettivi i diritti di cittadinanza digitale.

(Established with the Legislative Decree of March 7, 2005, n. 82, the CAD(Digital Administration Code) was subsequently modified and integrated first with the legislative decree of August 22, 2016 n. 179 and then with the legislative decree of December 13, 2017 n. 217 to promote and make digital citizenship rights effective).

⁷ Proposta di legge presentata il 28 gennaio 2016, N° 3566 –Camera dei Deputati, d’iniziativa dei deputati Amato, Lenzi, D’incecco, Fossati, Carnevali, Capone, Patriarca, Miotto, Murer, Albanella, Albini, Beni, Paola Boldrini, Borghi, Burtone, Carrescia, Casati, Castricone, Cova, Crimi, Fusilli, Lodolini, Giuditta Pini, Rocchi, Romanini: “Disposizioni per favorire la diffusione della teleradiologia e semplificazione delle procedure relative all’installazione delle apparecchiature a risonanza magnetica”

(Law proposal presented on January 28, 2016, No. 3566 - Chamber of Deputies, on the initiative of the deputies Amato, Lenzi, D’incecco, Fossati, Carnevali, Capone, Patriarca, Miotto, Murer, Albanella, Albini, Beni, Paola Boldrini, Borghi, Burtone, Carrescia, Casati, Castricone, Cova, Crimi, Fusilli, Lodolini, Giuditta Pini, Rocchi, Romanini: “Provisions to encourage the dissemination of teleradiology and the simplification of the procedures relating to the installation of magnetic resonance equipment”)

⁸ Art.4 - Proposta di legge 28 gennaio 2016, N° 3566^[1]

(Art.4 – Law proposal of January 28, 2016, No. 3566)

⁹ CCNL del comparto sanità – Periodo 2016-2018, Capo II: Incarichi funzionali, Art. 14: “Definizione degli incarichi di funzione”

(NCBA of the health sector - Period 2016-2018, Chapter II: Functional assignments, Art. 14: “Definition of the function assignments”)

In the context of this document it is interesting to open a parenthesis with respect to the latter mentioned, which should carry out additional or more complex assignments, related to the organization of reference in the envisaged respective areas, with the aid of high and innovative specific professional skills with respect to those of the profile possessed; these tasks find expression in the following subcategories:

1. **Specialist**, whose provision requires, as a minimum requirement, the achievement of the relevant 1st level specializing master; regarding the certification of a previous professional path, evidently capable of enhancing the qualification achieved, and not replacing it, the indication of the time limit of five years of experience in the assigned role is shared.¹⁰ The actual absence of shared indicators for the configuration and recognition of the role of the SA in today's organizational structures approaches the actual need to measure the functional contribution in relation to the degree of complexity of such structures, which leads us to rethink the balance and fragmentation of the functions in a systemic perspective, even if aimed at the capillary monitoring of the respective contexts of the role development and implementation.

2. **Expert**, conferred to the professional with advanced skills acquired through the attendance of additional regional training courses and/or by performing professional activities recognized by the same territorial entities.

In relation to the differences found on the national territory in terms of training and continuous updating of the professionals to whom the role is attributed, we share the opportunity to direct the governing bodies toward the definition of minimum criteria for the formulation of intervention plans in line with the current regulatory provisions.

In the envisaged scenario, there are the conditions for rethinking the possible organizational repercussions that such enhancement system would help to support, in the awareness of knowing how to give this tool the necessary development opportunities.

As already mentioned, the degree of complexity of the organizations called to regulate the attribution of these assignments will be the fundamental prerequisite against which to envisage multiple levels of responsibility, and, transversally, to sectorialize by contexts and areas of competence: we could share the need to supervise the administration of systems at the top level and, at the same time, at the intermediate level.

In this sense, the professional profile of belonging can dictate the reference context (by way of example in the radiological area the role can be attributed to a TSRM, likewise in the laboratory area to a TSLB), and depending on the degree of complexity of the organizational structure we can identify more experts dedicated to specific operating sectors (see figure 1).

¹⁰ *Pacs Administrator and Imaging Analyst* - University of Maryland, Medical System:
<https://jobs.umms.org/ShowJob/JobId/2017343/PACS-Administrator-and-Imaging-Analyst>

Classification document: profile analysis of the MIS/PACS systems administrator

MIS-PACS COMPANY ADMINISTRATOR – Appointed by the Data Controller
 ADMINISTRATOR OF THE RIS-CIS-ENDOSCOPIC AREA – Appointed Administrators
 ADMINISTRATOR OF THE LIS AREA - Appointed Administrators
 ADMINISTRATOR OF THE PATHOLOGICAL ANATOMY AREA - Appointed Administrators
 ADMINISTRATOR OF THE TELEMEDICINE AREA - Appointed Administrators
 N. OF ADMINISTRATORS FOR N. OF AREAS

Fig. 1 Hypothesis of functional diagram as an example, replicable according to the organizational model adopted at company level

Analyzing these ideas, it will be interesting to observe how integrative bargaining will be able to implement the appropriate forms of elevation of the incentive dynamic, in the awareness of knowing how to dispose of human resources in the companies; hence the deep and widespread knowledge of them and of the related acquired and consolidated skills, and the ability to use all the elements potentially able to offer added value to the mandate objectives, in function of the tendency to support a process of continuous improvement.

1.1 Survey

The vast distribution of the forms of attribution of the SA role on the national scene can actually be a prerequisite against which to ask the question of what exists to date on the merits of the forms of attribution of the role; indirectly the question that arouses a greater interest towards the current state is related to which initiatives are worthy of being radically supported by the governing bodies for the purpose of standardizing the recognition process, considering a historical context favoring the growing transversalization of organizational models and the development of inter-professional policies.

In light of recent legislative innovations¹¹, and of the growing organizational complexity that today's companies are about to manage, during the month of March 2020 AITASIT develops an intake, aimed at defining the state of the art regarding the recognition and attribution of the SA role in the health sector, and more specifically in the management of MIS and PACS; the choice to submit the questionnaire to the "Gruppo Dirigenti" (Team Managers) within the FNO (National Federation Order) TSRM THPRP performs the dual function of obtaining a synthetic mapping of the forms of attribution, preserving their technical and disciplinary scope. The questionnaire consists of three parts:

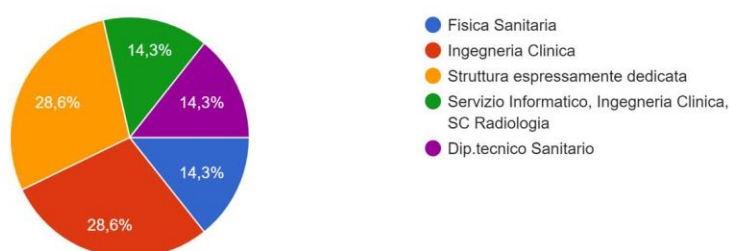
1. *classification of the reference territorial company*, aimed at a preliminary identification of the contextual requirements characterizing and predisposing the forms of attribution of the role, for the purpose of an overall evaluation of the recognition process in full;

¹¹ A titolo esemplificativo il sopracitato Contratto Collettivo Nazionale di Lavoro - Comparto Sanità 2016 – 2018, così come la Legge n° 3/2018 relativa al Riordino delle Professioni Sanitarie (By way of example, the aforementioned National Collective Bargaining Agreement – Health Sector 2016 - 2018, as well as Law No. 3/2018 relating to the Reorganization of Health Professions)

2. *section dedicated to the Health Professionals who hold management positions in various capacities and belong to the Gruppo Dirigenti (Team Managers) within the FNO (National Federation Order) TSRM THPRP*, drawn up in accordance with the objective of recording the main organizational models tested for the creation of teams dedicated to systems management, the administration of the relation of these professional groups with the supply companies, the estimated training paths, and the contractual prerogatives put in place;

3. *section for the Health Professionals involved in the management of Information Systems* in their own professional context (SA), in order to deepen some of the aspects mentioned above from an operational point of view.

The results obtained allow to confirm the premises in the paragraph, effectively fueling awareness that to the present day the role of the SA remains essentially the prerogative of the TSRM profile; that consideration would follow the natural evolutionary process of MIS and PACS, although it is evident how the choice of organizational structures dedicated to the administration of systems in diagnostic imaging is parceled out in several entities, as shown in the following figure.

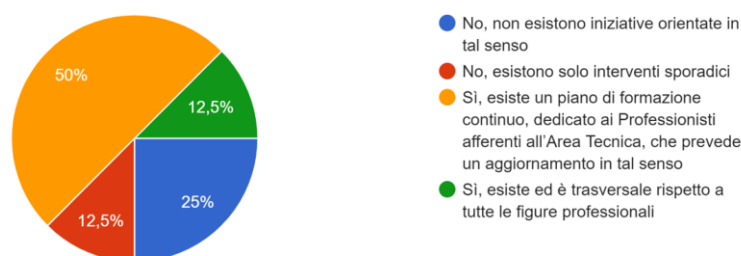


- Health physics
- Clinical engineering
- Dedicated structure
- IT service, Clinical engineering, radiology department
- Health technical dept.

Fig. 2 S.S.D. (simple departmental structure)/S.C. (complex structure)/O.U. in charge of managing the Information and IT Systems in Diagnostic Imaging at company level

The existence of a dedicated team for carrying out the system administration functions is not a common prerogative, just as the consolidation of proactive interactions between the SA and the Health Professions Executive is discontinuous, with the exception of some territorial and company bodies that are virtuous in this sense, at the organizational level and at the functional level.

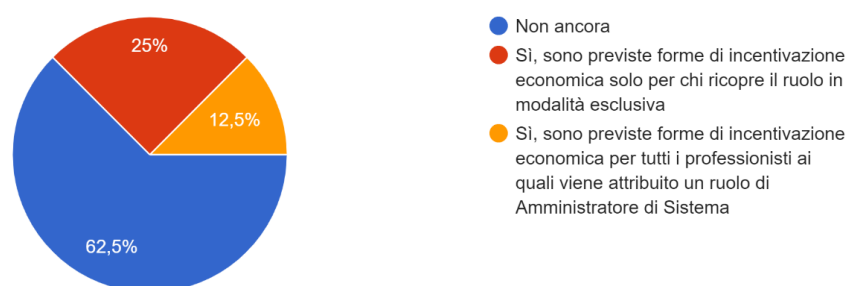
There's the interesting question relating to company training proposals aimed at reinforcing and disseminating greater awareness in terms of security and risk management (data management and confidentiality, protection of privacy, etc.): if the widespread orientation towards the preparation of periodically scheduled training interventions is comforting, we should also take into account the fair percentage of negative responses that unfortunately makes us understand what differences may exist with respect to the recognition of the role (see figure 3).



- No, there are no initiatives with such an aim
- No, there are only sporadic interventions
- Yes, there's a continuous training plan, devoted to the Experts related to the Technical Area, which involves an update in this sense
- Yes, it's transversal with respect to all the professional figures

Fig. 3 Preparation of company training courses dedicated to raising awareness of issues that characterize the MIS management

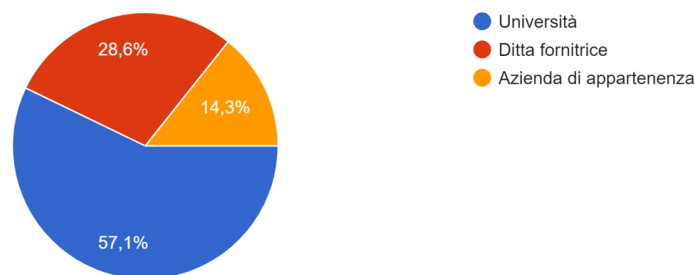
From a contractual point of view, the scenario does not differ much from the aforementioned condition (see figure 4), some supplementary company contracts actually provide for horizontal forms of career progression for the role inobject, while for most of the companies "participating" in the survey, to date there are no forms of enhancement of specialists such as the SA.



- Not yet
- Yes, there are forms of economic promotion only for the ones who hold the position exclusively
- Yes, there are forms of economic promotion for all the experts to whom the role of SA is appointed

Fig. 4 Forms of promotion and horizontal career progression provided for the SA at company level

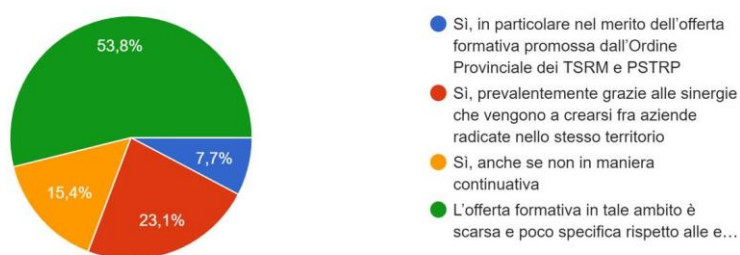
In terms of the curricular training of the SA, an important dissemination of the recognition of the role emerges, also towards the Professionals who do not possess the qualifying title (1st level Master), despite having participated in training initiatives specifically dedicated and offered by the reference companies or supply companies(see the graph below in figure 5)



- University
- Supply company
- Company of belonging

Fig. 5 Previous training experiences dedicated to the performance of the function, and promoter

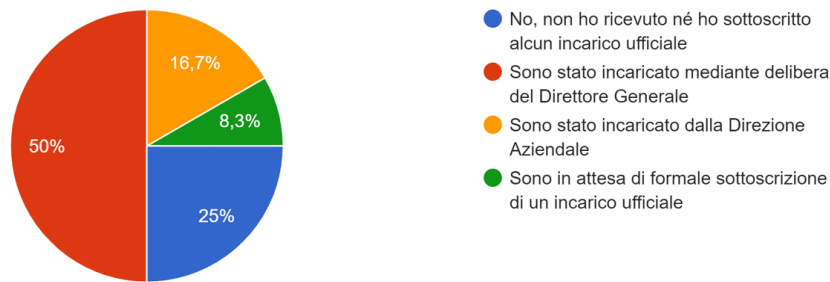
Also in this regard, participants are encouraged to declare the status of the training offer in their geographical area, a fundamental element for the diffusion of example organizational models and at the same time they can be replicated according to the specific dimensions and needs of the various companies (see figure 6).



- Yes, in particular regarding the training offer promoted by the Ordine Provinciale (Provincial Order) of the TSRM and THPRP
- Yes, mainly thanks to the synergy between companies rooted in the same territory
- Yes, although not continuously
- The training offer in this area is poor and not very specific with respect to...

Fig. 6 Training offer of the territory of belonging, in the sector dedicated to the function

The evidence of a poorly distributed training program at territorial level is weighted with respect to the needs perceived by the Health Professions of the three areas belonging to the same Order. Also with respect to the assignment of the SA function, different attribution methods are noted, such as summarized in Figure 7 below:

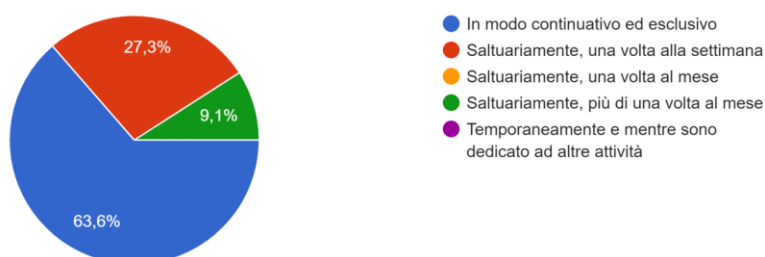


- No, I haven't gotten or signed any official assignments
- I have been appointed by resolution of the General Manager
- I have been appointed by the Company Management
- I am awaiting formal signature of an official assignment

Fig. 7 Methods of formalizing the SA appointment at company level

The fact that probably deserves to be further investigated, and on which it may be necessary to intervene in a radical way, is the percentage of SA that have not signed any assignment with the company of belonging, nor are waiting to formalize it.

Certainly the coexistence of antithetical realities on a formal level leaves room for the consequent reflections also in light of the different procedures for carrying out the function, which, as shown in figure 8, result, for the majority of the testimonies, continuous and exclusive, while in some contexts they're occasional with different levels of attention; the most reassuring emerging fact appears to be the absence of a function performed during activities other than the one specifically dedicated.



- Continuously and exclusively
- Occasionally, once a week
- Occasionally, once a month
- Occasionally, more than once a month
- Temporarily and while I carry out other activities

Fig. 8 Organizational method for carrying out the SA function

1.2 Training

Already with Legislative Decrees 502/92 and 42/99 and with the elevation of the qualifying title to the University Diploma, there was the first real milestone towards the definition of autonomy and levels of competence and responsibilities of professionals who, because of their professional profile, collaborated with other experts that, at the time, were the only ones qualified with a degree.

Law 251/2000¹², however remains an effective dividing line against that historical period in which the path of enhancement and empowerment of the health professions is completed, through the redefinition of the skills of all the professions, within the limits imposed by the relevant profiles and codes of ethics, and by defining the respective four areas; not least, the involvement of the Ministry of Health and University in the institution of Advanced Degrees has a strategic function for the evolution of the growth opportunities of the health professions also in the management field.

The contents of the basic and post-basic training are supported by progressive updates up to the identification of the specializing masters envisaged and mentioned in Law 43/06¹³, with which specific professional development paths, although worthy of further evolution both on a formal and on a substantial level, seem to be a training opportunity oriented towards a range of possible scenarios desirable also from an organizational point of view.

This identification, however, is completed also on a substantial level only recently, through the identification of the 90 Master courses ascribable to complete the application of the aforementioned legislation, and the guarantee of subordination of the assignment as a specialist professional only in possession of the 1st level Specializing Master¹⁴.

Specifically, the classification of the Masters in three categories develops the transversalization of the training courses that can be shared by all the professional profiles (TRANSVERSAL MASTERS), while reserving another plan of action to the INTERPROFESSIONAL ones, which can be attainable for multiple profiles, and to the SPECIALIZED ones: in the latter

¹² Legge del 10 agosto 2000, n°251: "Disciplina delle professioni sanitarie infermieristiche, tecniche, della riabilitazione, della prevenzione, nonché della professione ostetrica"¹³

(Law of August 10, 2000, No. 251: "Discipline of the nursing, technical, rehabilitation, prevention health professions, as well as the obstetric profession")

¹³ Art. 6, Comma 1, Legge del 1 Febbraio 2006 n°43 ("Disposizioni in materia di professioni sanitarie infermieristiche, ostetrica, riabilitative, tecnico sanitarie e della prevenzione e delega al Governo per l'istituzione dei relativi ordini professionali"): "c) Professionisti specialisti in possesso del master di primo livello per le funzioni specialistiche", primo chiaro riferimento curricolare al percorso formativo da ritenersi idoneo nel merito dell'attribuzione di ruoli e/o posizioni funzionali specialistiche.

(Art. 6, Paragraph 1, Law of February 1, 2006 No. 43 - "Provisions relating to nursing health professions, obstetric, rehabilitation, technical, prevention health professions and delegation to the Government for the establishment of the related professional orders": "c) Specialist professionals with a first level master's degree for specialised functions", first clear curricular reference to the training path to be considered suitable in terms of the assignment of roles and/or specialist functional positions).

¹⁴ Art. 16, Comma 7, CCNL 2016-2018 Comparto Sanità: "il requisito per il conferimento dell'incarico di professionista specialista è il possesso del master specialistico di primo livello di cui all'art 6 della Legge n. 43/06 secondo gli ordinamenti didattici universitari definiti dal Ministero della Salute e il Ministero dell'Università, su proposta dell'Osservatorio nazionale per le professioni sanitarie, ricostituito presso il MIUR con il decreto interministeriale 10 marzo 2016 e sentite le regioni".

(Art. 16, Paragraph 7, NCBA 2016-2018 Health sector: "the requirement for the appointment of the position of specialist professional is the possession of the first level specializing master referred to in Article 6 of Law no. 43/06 according to the university education systems defined by the Ministry of Health and the Ministry of University, upon the proposal of the National Observatory for Health Professions, reformed at the MIUR – Italian Ministry of Education - with the interministerial decree of March 10, 2016 and after consulting the regions").

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area there's the 1st level Master in "IT area and system administrator".

Below are the names of the post-graduate training courses that currently allow the certification of the skills of the experts in the technical-diagnostic area that in any capacity contribute to the management of systems for the collection and automatic processing of patients' health data and for the strategic marketing management of diagnostic resources.

This denomination does not take into account the modalities of delivery of the training courses, although underlining the importance of a fair division between theoretical knowledge, laboratory simulations and practical training according to the most accredited models based on the Collaborative Lifelong Learning:

- 1st level Master for "IT area and system administrator"
- II level Master for "Responsible of the Substitute Legal Conservation"
- Expertise course for the position of person in charge of the enhancement of information systems and optimization of the quality in complementary diagnostics (accredited according to the University regulations regarding Advanced Training Courses)
- Certification paths included in the specialization phase (CISCO and eCF)

A parenthesis deserves to be opened about the recent inclusion of the TSRM in group 2 of Isco-08 by ESCO (European Skills/Competences, qualifications and Occupations), that is between *intellectual and scientific professions*, thanks to the efforts made by the EFRS (European Federation of Radiographer Societies) in 2018; this initiative elevates the profile from the previous group 3 (intermediate technical professions) that brings together other experts now included in the Order of TSRM and THPRP (Technical Health Professions of Rehabilitation and Prevention), such as the TSLB which, as mentioned, can hold the role of SA for their respective areas of expertise.

The aforementioned excursus has the dual function of defining successive training steps, capable of diversifying the progressive levels of competence that can be acquired by the SA, which, at an operational level, prepare the specialists to make their contribution in different scenarios and development contexts, as summarized in the next figure (figure 9).

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Development contexts of the SA role

DIS/PACS systems management

- digital iconographic and administrative documentation in diagnostics and radiotherapy
- compliance with the privacy legislation
- transition to digital
- document management and data security
- training planning for the personnel involved in the processes of
- digitization
- dematerialization
- use of ICT applications in the health sector

Personal services and legal technical consultancy

- support for medical and legal problems
- collaboration with the judicial authority
- support and participation in committees of inquiry
- officially appointed technical consultant and expert witness gig
- in-house diagnostics
- civil protection

Econometric and support to management dashboards

- management control
- budgeting
- Business Intelligence (human resources and workloads)
- planning for new IT technological implementations
- application of the new health technologies
- Risk Management
- HTA

AI & digital bio-manufacturing

- implementation, management, use and analysis of digital bio-manufacturing systems
- 3d reconstructions
- augmented reality
- virtual autopsy
- rapid prototyping
- veterinary
- conservation of digitized cultural heritage

Fig. 9 Work contexts and development scenarios of the SA role

2. The core curriculum of the MIS/PACS systems SA

The lack of scientific publications at national level characterizing a mapping of the activities expected by the function of the MIS/PACS Systems Administrator in the health sector leads to reserve a space dedicated to this purpose in this document, as a food for thought with respect to which to include a possible, even if following, transversalization towards the health professional profiles belonging to the same Order, as well as the preparation of a flexible and dynamic tool, such as to allow future revisions and additions in line with the technical operational progress.

On an international scale, bibliographic contributions supporting the areas of interest of the SA lead to reflection on the specific activities in which the SA can be involved in various capacities and/or his/her presence can be defined as a surplus value; the possession of company know-how and managerial training, and the ability to relate effectively to different stakeholders lead the dedicated professional to take responsibility for the role assigned to him/her with increased awareness and mastery¹⁵.

Also on the basis of these premises, this chapter proposes a summary of what can be called the Core competence of the DIS/PACS SA, with the definition of a vast, though not exhaustive, list of activities in which the dedicated DIS-PACS professional finds space and is actively involved; the methodological approach used is expressed in the categorizations below.

- **DEVELOPMENT MACRO AREAS:** in line with the representation of the development contexts shown in the previous chapter (see fig....), seven areas are identified, thanks to them we can understand how the intervention of an adequately recognized SA can help to promote the good outcome of the planned actions
 - o Management of digital iconographic and administrative documentation in the field of diagnostics and radiotherapy;
 - o Support activities for compliance with the privacy legislation, transition to digital, document management and data security;
 - o Training planning activities for the personnel involved in the digitization, dematerialization processes and for the use of ICT applications in the health sector;
 - o Support activities for medical and legal issues, collaboration with the judicial authority, support and participation in committees of inquiry; officially appointed technical consultant and expert witness gig;
 - o Activities of implementation, management, use and analysis of digital bio-manufacturing systems;
 - o Support activities for management dashboards: management control, budgeting, resource management;
 - o Planning activities related to new IT technological implementations, application of the new health technologies.

- **AREAS OF EXPERTISE:** within each macro area the individual activities are cataloged according to their characteristics and related purposes

- o *specific-technical*;

- o *managerial (organizational)*;

- o *relational (communication/training)*.

- **LEVELS OF COMPETENCE:** the activities are graded according to two intensity levels, coded respectively by different colors in Table 1, directly consistent with the level of the strategic nature comparable to

¹⁵ Paul Nagy, Ph.D., George Bowers, Bruce I. Reiner, MD, Eliot L. Siegel, MD, "Defining the PACS Profession: An Initial Survey of Skills, Training, and Capabilities for PACS Administrators ", Journal of Digital Imaging, vol. 18, No. 4 (December), 2005:252-259

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the context of application and to the stakeholders, and indirectly with the level of preparation and dedicated training required of the professional:

- o **basic** (white color)

- o **advanced** (green color)

Tab. 1 Mapping of activities

CORE CURRICULUM OF THE MIS/PACS SA			
DEVELOPMENT MACRO-AREAS	ACTIVITIES BY AREAS OF EXPERTISE		
	SPECIFIC- TECHNICAL	MANAGERIAL	COMMUNICATION/TRAINING
Management of digital iconographic and administrative documentation in the field of diagnostics and radiotherapy			

Support for the management and daily operation of the MIS/PACS systems	Development and implementation of the MIS/PACS systems: contribution in customizing the solutions chosen for their greater effectiveness in the reference context	MIS/PACS system user training through policy-oriented interventions aimed at preventing possible risks and the potential connected to the use of digital systems
Post-installation maintenance support for the MIS/PACS system	Definition of paths and procedures, in collaboration with other profiles, for the use of ICT systems in the enhancement of continuity of care	Promotion of cooperation and collaboration with the figures responsible for managing other company and inter-company DBs
Management of data storage and retention and related backups	Support in decision-making processes through statistical inference based on quantitative and qualitative data managed by MIS/PACS systems	Drafting of documents/procedures aimed at providing information on the correct use of information systems, to guarantee greater reliability and accuracy of data
Validation of the data acquired by digital signature	Support in the development of scheduling programs for the management of the equipment and related reservations with particular regard to: traceability of operations, analysis of workloads and machine downtime, with a view to optimizing the performance	Contribution to the training of health professionals on the use of new information acquisition equipment and data transmission technologies
Use of computer protocols for the transmission and storage of data	Use of the MIS/PACS system to eliminate or minimize any redundancies	
Development of computer protocols for entering patients' data	Management of the traceability of utilization for the production/preparation of radiopharmaceuticals and radioisotopes	
Support for the management of the circularity of the unique personal data	Contribution in the preparation of measures aimed at ensuring the quality of the information transmitted and received in the context of the provisions provided through telemedicine services (and respective differences from the initiatives undertaken for the services provided in the conventional way)	
Management of the digital methods for the collection of informed consent in the various reference areas		
Management and facilitation of interoperability between the different I.S.		

Facilitation of IT integration between I.S. and applications		
Contribution to the rationalization of the flows in RT		

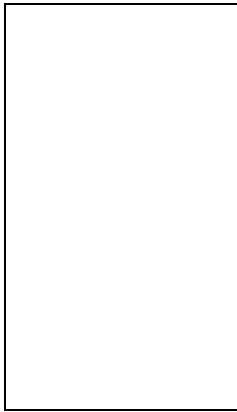
Management of feedback between scheduling programs belonging to integrated I.S.		
Facilitating interoperability between I.S. and Treatment Planning System		
Facilitating interoperability between I.S. and technologies involved in the delivery of treatment plans (LINAC)		
Facilitation of Interoperability between I.S. and precision applications in RT (IGRT, SGRT)		
Support in the preparation of measures to guarantee the security of systems dedicated to communication, video production, and cloud management, through the adoption of technical organizational measures suitable and adequate for the security of information shared in the field of telemedicine		
Support in the management and maintenance of the information system through which the "provider center" performs the provision of telemedicine		
Preparation of the tools aimed at ensuring the retention of the information on data processing and informed consent in relation to services performed in telemedicine		

<p>Collaboration in the management of IT security or in the preparation of measures dedicated to the protection of networks and systems, in order to prevent and/or detect intrusion attempts in the context of the services dedicated to telemedicine</p>		
<p>Contribution to the formulation of procedures and actions aimed at guaranteeing confidentiality, through technical solutions for the profiling of the users of the telemedicine service</p>		

Support activities for compliance with the privacy legislation, transition to digital, document management and data security	Management of access credentials to the MIS/PACS system	Monitoring of all the measures relating to compliance with the confidentiality of patients' data	
	Identification of the main types of errors or adverse events connected to the use of the DIS/PACS system (both from a qualitative and a quantitative point of view)	Promotion of improvement projects based on the potential of ICT aimed at simplifying internal procedures	
	Back up and Disaster recovery: implementation, monitoring and updating of the security procedures and measures for data recovery and for maintaining business continuity, in accordance with the current legislation and any indications by the Data Controller		
	Planning of the redundancy of information systems and dedicated networks		

Planning of the system backup		
Planning of periodic updates of the types of data to be sent in evidentiary consolidation		
Digital signature of volumes of technical data for the purpose of legal retention	Drafting of procedures for accessing and managing sensitive data , in collaboration with the professional figures appointed by the company, and in compliance with the current regulations	Dissemination and awareness of the use of the company solutions chosen to facilitate user access to services
	Analysis of data processing in specific cases, to support research, control and verification activities aimed at both internal and external investigative activities	
	Use of ICT systems in order to identify process quality indicators and report monitoring	

Training planning activities for the personnel involved in the digitization, dematerialization processes and for the use of ICT applications in the health sector	Collection of data relating to the use and management of ICT systems		Use of the inference of data from MIS/PACS systems to analyze the training need of the operators regarding the correct and safe management of applications and sensitive data
	User education on the use of Digital Identity tools		Programming of internal courses for the staff update on the upgrading of MIS/PACS systems and for the fine-tuning of intercurrent problems (e.g. workflow simplification), scheduled on a regular basis and with periodic verification
	User education on the use of the Electronic Health Record		Support to the provision of training interventions according to the identified learning objectives
	Highlighting of the risks associated with the fraudulent use of data processed in IT systems		
	Identification of specific ICT-based research areas		Definition of learning objectives relating to the use of ICT technologies, implemented platforms and applications , in order to promote, design and deliver the related connected training courses
	Monitoring to ensure compliance with the principles of ethics and deontology in the collection and use of sensitive data		Definition of learning objectives relating to the protection of the confidentiality of sensitive data in order to promote, design and deliver the related connected training courses



Support activities for medical and legal issues, collaboration with the judicial authority, support and participation in committees of inquiry; officially appointed technical consultant and expert witness gig	Consulting on technological and IT products	Legal advice in the field of intervention	
	Show the archived documentation	Promotion of technology development opportunities	
	Adequate preparation of procedures for the certain identification of professionals who access the information systems		
	Preparation of the exhibition pack	Preparation of the procedures aimed at correcting any discrepancies or problems that emerged in the course of internal investigations or third parties	Collaboration with the press office for the correct management of corporate communications

Cooperation with the control bodies in the event of legal disputes	Joint definition of the methodologies and processes to be shared for the implementation of	
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	technologies	
	Assessment of the impact of technologies on the organization (to be contextualized)	
	Legal interpretation of the applications	

Activities of implementation, management, use and analysis of digital bio-manufacturing systems	Use of the possibilities provided by the information systems to identify the assisted person		
	Collection and digitization of informed consent in the various reference areas		
	Validation of the images acquired through activity-report		
	Digital signature of the activity-report		
	Digital signature of the three-dimensional models created		
	Storage of three-dimensional models in standard file formats		

Support activities for management dashboards: management control, budgeting, resource management	Extraction of activity and productivity data		
		Intervention in occasion of the Department and Corporate Monitoring Group meetings.	
		Workflow control, collaboration in drafting statistics and in corporate reporting	
		Involvement in technical commissions set up for the renewal of technological resources in diagnostic imaging, from the identification of needs, to the subsequent planning, feasibility of the project, acquisition, evaluation and allocation of technology	
		Optimization of the available resources through the creation of scheduling programs, the analysis of workloads and the reporting relating to equipment downtime	
		Use of the data processed to report organizational malfunctions or anomalies found in the distribution of workloads	

Planning activities related to new IT technological implementations, application of the new health technologies

Network design	Implementation and contribution in monitoring the effective observation of the provisions of the procedures relating to the Regulation for the use of teleradiology and remote diagnosis between O.U. of the Health Company	
Sizing of active network devices	Support for the design of new wards and new hospital districts	
Support activities for the design of the ergonomics of information systems	Development of organizational models capable of describing the functional relationships inherent in a Telemedicine service, for evaluation and improvement purposes	
Proposal of the solutions necessary to ensure the confidentiality, integrity and availability of data in the use of telemedicine services (in collaboration with the DPO or another figure delegated by the Data Controller)	Assessment of the predisposition of measures to guarantee, in emergency situations, the respect of the basic characteristics of a telemedicine service and the supply of all the support tools for the activities to the health personnel - source: rapporto ISS covid 19 n 12/2020 (ISS covid 19 report n 12/2020), "indicazioni <i>ad interim</i> per servizi assistenziali di telemedicina durante l'emergenza sanitaria COVID-19" (interim indications for telemedicine assistance services during the COVID – 19health emergency)	

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Conclusions

With this document AITASIT intends to provide a clear and firm basic orientation for the Companies and Bodies that are preparing to define increasingly complex and articulated organizational models in which duly described and functional positions can be expressed, consistent with the principle of the professional valorisation; the natural emergence of a growing separation between the line of the company strategic summit and the operational line of the professionals involved favors the consequent and necessary chance to bring out opportunities for professional development and organizational innovation with respect to the change processes involving multidisciplinary contexts, leading to the growth of apparently heterogeneous groups of stakeholders involved in the increase of the required level of complexity.

This is the premise, albeit the final act of this document, of what can be used in functional terms in the plan of today's future-oriented organizational matrices, capable of placing duly qualified Health Professionals, as well as trained, in strategic positions of the company summit: being able to include a reference model, responding to the need to be able to manage the organizational complexity also in reason of the respective tasks and functions attributable to professionals capable of performing them, implies the recognition of training courses undertaken and growth matured in the interim of an organizational system in constant transformation, against the background of the progressive implementation of evaluation systems attentive to the enhancement of the potential and to the guarantee of the principle of equity.

Contemplate and process the evaluation process in a complex organization such as the healthcare one can radically be an important strategy, truly oriented towards the creation and consolidation of the intellectual capital resulting from the harmonization of individual and collective interests, and responsible for the growth of multidisciplinary teams inherent in the cultural and managerial structure of today's organizational units.

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