PROFESSIONALS' USE OF IT IN HOSPITALS: EVIDENCE OF USER ACCEPTANCE AND INSTITUTIONAL FACTORS FOR THE EMRs IN ITALY

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ABSTRACT

This study investigates the factors that affect the continued use of Electronic Medical Record (EMR) in hospitals. Our model integrates constructs such as perceived usefulness and ease of use (Technology Acceptance Model) along with constructs associated to organizational expectations, change culture and alignment of meaning systems (institutional theory). Tested on hospital professionals, our results provide full support to the TAM model, and only partial support to the hypothesis that institutional factors have a direct and indirect (i.e. mediated by TAM) effect on EMR continued use. Results reveal, in fact, significant direct and mediated relationships only for organizational expectations.

Keywords: Healthcare; Hospital; Electronic Medical Record; ICT; Technology Use; Technology acceptance.

INTRODUCTION

The mechanisms that drive the adoption of Information and Communication Technologies (ICTs) within organizations remain a controversial issue, especially in professional settings such as healthcare (Gastaldi et al., 2012). A still fragmented and puzzled theoretical frame fosters this controversy as the fields of organizational studies and information systems have explained employees' adoption of ICTs in two significantly different, sometimes conflicting, ways.

Organizational studies conceive organizations, in particular professional ones, as strongly institutionalized settings in which individual behaviours are bounded by a complex combination of regulations, social norms and cultural systems (Van Dijk et al., 2011). Employees' decision to engage with new technologies and thus with new practices is not entirely based on rational thinking, but it is affected by the influence of the *overarching structures, rules, social norms and culture* in which they are embedded (Scott, 1995; Butler, 2011).

Information systems research, vice versa, has mostly adopted user acceptance models, which emphasise individuals' rational and volitional assessment of the costs and benefits they would attain from the new technology. The most popular model is perhaps the Technology Acceptance Model (TAM). TAM identifies two main antecedents, i.e. the *perceived ease of use* and the *perceived usefulness* of the new technology, which have received extensive validation in multiple settings (Venkatesh et al., 2003; Tate et al., 2015).

These theoretical perspectives elicit very different strategies for the adoption of new ICTs. Institutional theory argues that individuals reinforce the status quo, often 'mindlessly'

since the "institutions embodied in routines rely on automatic cognition and uncritical processing of existing schemata, and privilege consistency with stereotypes and speed over accuracy" (Lawrence et al., 2009; p. 15). So, this theory calls for the introduction of new symbolic systems, relational systems, routines and artefacts that convey new structural, normative and cultural conditions favourable to the adoption of new technologies (Currie, 2012). By contrast, user acceptance models build on individuals' self-determination and rationality, and call for strategic and promotional interventions that fit processes, structures and/or technologies with their perceptions of ease of use and usefulness.

Both research streams have independently tried to incorporate elements of the other theory to enrich their explanatory power. User acceptance models have increasingly incorporated the *direct* effects of social influences and organizational conditions on individuals' behavioural intention (e.g. Chang et al., 2007). Similarly, recent institutional studies argued that the institutional influences are not "cognitively totalizing structures [and] even when actors are subject to institutional influences, they can develop a practical consciousness" (Battilana and D'Aunno, 2009; p. 47). Hence, it is conceded that individuals' self-determination – constrained and bounded as it may be – plays a significant role even in highly-institutionalized settings (Leca et al., 2008).

In the wake of these considerations, our study seeks to integrate these theories even further. We develop and test a model that:

- Consistently with previous research, tests the role of TAM-like and institutional factors as separate and direct antecedents of professionals' use of a new ICT;

- As a new contribution, argues that institutional factors are *mediated* by TAM-based factors, such as individuals' perception of ease of use and usefulness.

Regarding the latter, only few studies have tested both explanations in an integrative framework (e.g. Lewis et al., 2003). Most studies have instead adopted the institutional perspective only to explain the behaviour of organizations, not individuals (e.g. Mignerat and Rivard, 2009; Messerschmidt and Hinz, 2013; for an exception, see Jensen et al., 2009).

The model is tested in the context of hospitals as professional organizations and assesses hospital professionals' use of Electronic Medical Records (EMRs). Hospitals are peculiar and exemplary settings to test our model since past research strongly supports both TAM-related (Pai and Huang, 2011; Ryu et al., 2003; Chang et al., 2007) and institutional explanations (Currie and Suhomlinova, 2006; Kennedy and Fiss, 2009; Thomas and Hewitt, 2011). The coexistence of these results offers the ideal setting where to investigate if and how the two theories are connected. In particular, we have the opportunity to gather original insights on: 1) how TAM and institutional factors affect the adoption of new technologies; and 2) if and how the two perspectives (TAM and institutional) are interdependent and should be combined to provide an integrated understanding of how to maximise technology adoption within professional organizations. Additionally, by building and testing the model in the healthcare setting, where the conundrum between TAM and institutional theory is evident, our study aims to derive practical implications for more effective adoption of ICTs also in other professional settings.

THEORETICAL MODEL

INSTITUTIONAL THEORY AND INSTITUTIONAL FACTORS: DIRECT EFFECTS

The institutional theory provides a structuralist explanation about the adoption of technologies in organizations. According to this perspective, individuals are embedded in institutional pillars that limit the scope of their rational assessment and direct the engagement of specific behaviours (Scott, 1995; Barley and Tolbert, 1997). Past studies have agreed on the existence of three main institutional pillars (Scott, 2001):

- *Regulative pillar*: which regards the existence of regulations, rules and processes whose breach is monitored and sanctioned;
- *Normative pillar*: which introduces a social dimension of appropriate behaviour in the organization;
- *Cultural pillars*: which emphasizes the use of common schemas, frames, and other shared symbolic representations that create attachment to the 'appropriate' behaviour.

These pillars shape the adoption of new technologies and innovations beyond individuals' cost-effectiveness assessments, i.e. individuals embedded in the same context are likely to display similar behaviours, because they comply with identical institutional influences. Scott (2001; 2003), in particular, argued that each institutional pillar triggers distinct mechanisms of compliance. The basis of compliance for the regulative pillars is expedience, and their basis of legitimacy is legal sanction. Hence, individuals comply with regulative influences because of coercive mechanisms. The basis of compliance for the normative pillars is instead social obligation and their basis of legitimacy is moral governance. Hence, individuals comply with normative influences because of social mechanisms (e.g., 'peaceful coexistence'). Finally, the basis of compliance for the cultural-cognitive pillars is the taken-for-grantedness of an 'orthodox' logic of actions. Individuals comply with a cognitive-cultural influence because of mimetic mechanisms.

Importantly, changes in the institutional pillars are 'carried' by new symbolic systems, relational systems, routines and artefacts (Scott, 2003). New regulative pressures are 'carried' by laws, protocols and standard procedures; normative pressures by the nature of the organizational role, by obedience to duty, and conventions; new cultural-cognitive influences are 'carried' by objects possessing symbolic value, such as evidence-based documents or opinion-leaders' artefacts.

In our study, regulative, normative and cultural-cognitive influences moved through three institutional carriers (e.g. Lawrence and Suddaby, 2006; Kellogg, 2009; Kennedy and Fiss, 2009; Currie et al., 2012):

- *Organizational expectations,* which represent how the organization, in the absence of rules that could compel professional employees to use EMR, pursues a semi-coercive mechanism through formal plans and budget indications;

- *Alignment of meaning systems*, which represents if and how professionals' meaning systems regarding daily and professional priorities are consistent with the adoption of the new technology;

- *Change culture*, i.e. the extent to which the organization is focused on the constant improvement of methods, technologies and practices to achieve competitive advantages and improve service appropriateness. Drawing upon the main arguments from institutional theory, we thus hypothesize that these proxies directly affect individuals' use of EMR:

H₁: Individuals embedded in a highly institutionalized context display common degrees of continued use of a new technological system. Specifically, individuals embedded in institutional contexts characterized by higher organizational expectations of technology use, higher alignment of meaning systems toward technology use, and higher change culture display higher rates of continued use of a new ICT system.

TECHNOLOGY ACCEPTANCE MODEL: DIRECT EFFECT

TAM was first conceptualized in the '80s, when Davis and colleagues noticed that employees resisted the use of technologies made available to them by the organizations (Davis, 1989; Davis et al., 1989).

Originally, the factors determining the intention to use a technology were taken mostly from the Theory of Reasoned Action (TRA; Fishbein and Ajzen, 1975) and the Theory of Planned Behaviour (TPB; Ajzen and Driver, 1991). TAM has undergone a number of modification, which originated different models, such as the TAM2, which adds a variable about the social influence towards adoption (Venkatesh and Davis, 2000), the UTAUT, which reasons about the influence of performance expectancy (Venkatesh et al., 2003). For the sake of our study, we rely upon the original model, which is still most commonly used and consistently proved as effective (Holden et al., 2012). Additionally, the potential role of social influence is already captured by the inclusion of institutional factors (H1).

Several studies in the information systems literature have extensively demonstrated that professionals' use of a new technology is directly explained by their perception of ease of use and of usefulness (Venkatesh et al., 2003; Gupta et al., 2008; Lankton et al., 2014; Walsh, 2014). The role of user acceptance has been also specifically investigated with regard to EMRs in hospitals (2005; Hayrinen et al., 2008; Walter and Lopez, 2008; Ilie et al., 2009). We expect our study to confirm such findings, and thus we hypothesize the following:

H₂: Individuals' perceived ease of use and perceived usefulness of a new ICT system are positively correlated with its continued use.

MEDIATION EFFECTS

H₁ assumes that individuals would use EMR beyond, or even without, a rational assessment of its advantages. If unmediated by a user acceptance model, that hypothesis would suggest that individuals (in our case, professionals) do not decide to use an EMR, but are rather induced/urged by institutional factors. By contrast, H₂ assumes that institutional influences are bypassed by the individual, i.e. the perception of usefulness and ease of use is fully determined by a rational assessment of the technology, and fully determines the decision to adopt the technology.

An alternative view suggests that institutional factors might not determine individuals' behaviours, but represent relevant information affecting how they perceive the ease of use and/or usefulness of a new technology. This interpretation is consistent with more recent interpretations of institutional theory, according to which individuals embedded in organizations with stronger institutional influences are more likely to perceive the usefulness and ease of use of a new technology, but still retain enough practical consciousness to rationalize its adoption (Pozzebon, 2004; Lawrence and Suddaby, 2006).

We argue that institutional factors affect individuals' perceptions of ease of use and usefulness. Such links, if proven, would extend findings on the antecedents of the TAM, which have thus far focused mostly on psychological, technological and contingent factors (e.g.

Karahanna and Straub, 1999; Legris et al., 2003; King and He, 2006). We thus hypothesize the following:

> H_3: *Organizational expectations, the alignment of meaning systems, and change culture are positively correlated to individuals' perceived ease of use and usefulness.*

CONTROL VARIABLES

We include respondents' gender, age, and technological experience as control variables – consistently with past research on user acceptance models (Agarwal and Prasad, 1999; Morris and Venkatesh, 2000).

RESEARCH METHODOLOGY

We surveyed the literature to identify valid measures for related constructs and adapted existing scales to measure the different constructs mentioned in the theoretical background. Measures associated with user acceptance models, and use of the technology have been derived and adapted from Venkatesh et al. (2003). Past research is relatively scant of empirical measures of institutional factors (mostly investigated through qualitative methodologies). We thus decided to adapt scales from non-institutional studies to institutional purposes, and specifically derived the measures for organizational expectations, change cultures and alignment of meaning systems respectively from Ajzen (1991), Khoja et al., (2007) and Ravlin and Meglino (1987). All indicators were measured using a seven-point Likert scale.

There were two preliminary assessments of the questionnaire. First, we submitted it to academics in the field of ICT-driven innovation in healthcare for their review. Next, we pre-tested it in a hospital, which we visited to conduct face-to-face discussions with healthcare professionals. Based on the feedbacks, we modified the wording of some questions and added or deleted some others, in order to ensure that the items were understandable and relevant to professionals. The complete scales are listed in Table 2.

Data were collected from four hospitals in Northern Italy whose EMRs proved to be mature and highly performing. This choice relies on the willingness to limit potential confounding factors related to EMRs whose implementation was still in progress and not consolidated. The choice has been supported by analysing the investments in EMRs made by more than 100 Italian hospitals from 2008 to 2013. The four selected hospitals were the ones with the most mature systems according to the well-established and respected HiMSS EMRAM[TM] ranking[1].

For each hospital, we identified a key informant, who typically was the Chief Information Officer (CIO), knowledgeable about EMR usage within the hospital. We contacted the key informants by telephone in order to obtain their preliminary agreement to participate, and to select randomly a sample of respondents.

We mailed the questionnaire to the respondents, along with a cover letter highlighting the study's objectives and potential contributions. The cover letter also clarified that the survey was related to a scholarly research project, whose success was dependent on accurate and objective responses. In this regard, healthcare professionals were informed that there were

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[1] EMRAM stands for Electronic Medical Record Adoption Model, and is an eight-step process that allows to analyse a hospital's level of EMR adoption, chart its accomplishments, and track its progress against other healthcare organizations. For more information, see http://www.himssanalytics.org/emram.

no correct or incorrect answers to questions. The respondents were furthermore assured that all data provided would be handled with full confidentiality.

Follow-up telephone calls, mailings and face-to-face visits were used not only to improve the response rate (Frohlich, 2002), but also to address potential missing data issues. Out of four hospitals contacted, a total of 60 usable questionnaires were collected. This number mirrors previous studies in healthcare that acknowledged the difficulty to collect primary data from healthcare professionals (e.g., Mura et al., 2013). A profile of the respondents is presented in Table 1.

Hospital	Respondents (male and female)	Females respondents	Technologiecal experience[A]	Respondent age (in years)
Hospital 1	34	14	18.91	48.88
Hospital 2	9	8	14.00	47.78
Hospital 3	4	4	17.50	49.75
Hospital 4	13	0	9.54	39.83
Overall/ average	60	26	16.00	46.86

[A] *measured in years of*

Table 1. Respondents' main characteristics

To assess potential late response bias, we compared early and late responses on their EMR continued use (Armstrong and Overton, 1977), with a *t*-test showing no significant differences. No significant differences emerged also from comparing respondents vs. non respondents.

Finally, being all data collected from a single respondent, Common Method Variance (CMV) might be a concern. With this regard, we followed Podsakoff et al. (2003)'s recommendations for both ex ante remedies ex post tests. First, as told, before administering the survey, we pre-test carefully the items to ensure that ambiguous, vague or unfamiliar terms were not included. Furthermore, in the cover letter we guaranteed respondent confidentiality and emphasised that there were no correct or incorrect answers and encouraging respondents to provide independent and honest answers. Then, before we tested our hypotheses, we conducted Harman's single-factor test on the key variables of our theoretical model. The outcome of the test indicated minimal evidence of method bias (Harman, 1967).

To test our research model, we employed the partial least square (PLS) approach using Smart PLS (Oh et al., 2012), supported by a set of robustness checks, following the indication provided by Peng and Lai (2012). This components-based approach is appropriate to accommodate the presence of mediation relationships and to test them through bootstrapping. The dataset satisfies the criterion that the sample size should be at least 10 times larger than the largest number of structural paths directed at any one construct (Chin et al., 2003).

Table 2 shows the measurement scales of the reflective constructs investigated by our research model. The measurement model consists of six multi-item constructs with a total of nineteen indicators. We used several tests to determine the convergent and discriminant validity of the constructs. We controlled through an exploratory factor analysis that all item loadings between an indicator and its posited underlying latent variable were sufficiently high — with no relevant cross-loadings — and that both composite reliability (CR) and average variance extracted (AVE) were above the recommended threshold of 0.7 and 0.5 respectively (Fornell and Larcker, 1981; Nunnally and Berstein, 1994).

Constructs (Cronbach's Alpha)	Items (corresponding to the survey questions)*	Loading	CR	AVE
Organizational expectations (0.894)	**A**. My most esteemed colleagues believe that I should regularly use the EMR	0.865	0.934	0.826
	B. My most esteemed colleagues regularly use the EMR	0.928		
	C. The colleagues who I consider the best believe that EMR use is essential for the organisation	0.932		
Alignment of meaning systems (0.558)	**A**. I very much agree with most of the objectives set by the hospital managers	0.819	0.749	0.502
	B. I am often in conflict with hospital managers on the priorities I should pursue in daily practice [**]	0.604		
	C. I mostly disagree with the choices of the hospital managers about EMR	0.686		
Change Culture (0.607)	**A**. In our hospital, change is not perceived as a necessary evil, but as something to be promoted and supported	0.842	0.836	0.718
	B. I think that my hospital spurs its employees to reflect on how to improve job practices	0.853		
Perceived usefulness (0.844)	**A**. Using the EMR enables me to accomplish tasks more quickly	0.842	0.896	0.685
	B. The usage of EMR significantly enhances the effectiveness of my job	0.880		
	C. The usage of EMR significantly improves my productivity	0.855		
	D. The data in the EMR are sufficient to make my decision-making effective	0.723		
Ease of use (0.854)	**A**. It has been easy to me to become skilful at using the EMR	0.878	0.901	0.696
	B. I can get the EMR to do what I need to do	0.829		
	C. The EMR is easy to use	0.833		
	D. In a short period of time I have become an expert in using the EMR	0.794		
Continued use (0.808)	**A**. Using the EMR has become an habit for me	0.833	0.886	0.722
	B. I can't do without using the EMR	0.849		
	C. Using the EMR is natural to me	0.867		

* All items were measured on a 7-point Likert scale, where 1 = strongly disagree, 2 = moderately disagree, 3 = somewhat disagree, 4 = neutral (neither disagree nor agree), 5 = somewhat agree, 6 = moderately agree, and 7 = strongly agree
** The question is written in negative form to strengthen the statistical analysis and the representativeness of collected data

Table 2: Measurement properties of reflective constructs

To further test for discriminant validity, we compared the squared correlation between two latent constructs and their AVE estimates (Fornell and Larcker, 1981). These constructs meet the validity condition of the AVE estimates exceeding the squared correlation between each pair of constructs (see Table 3).

Variables	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1. Age	**1.000**								
2. Alignment of meaning systems	0.027	**0.709**							
3. Change culture	0.137	0.374	**0.847**						
4. Ease of use	-0.299	0.317	0.343	**0.834**					
5. EMR Continued use	-0.073	0.376	0.348	0.688	**0.850**				
6. Gender	-0.077	0.024	0.008	-0.044	-0.149	**1.000**			
7. Technological Experience	0.110	0.190	0.249	0.223	0.249	0.133	**1.000**		
8. Organizational expectations	-0.054	0.403	0.270	0.431	0.554	-0.158	0.145	**0.909**	
9. Perceived usefulness	-0.100	0.468	0.136	0.478	0.669	0.148	0.310	0.662	**0.827**

The square root of the average variance extracted (AVE) is shown in bold on the diagonal. Correlations are in the lower triangle of the matrix.

Table 3: Correlation matrix

Since our theoretical model includes both institutional and individual level latent variables, we also checked if individuals' perceptions of institutional factors (i.e., organizational expectations, alignment of meaning systems, and technological culture) have sufficient variance to be still measured at the individual level. In this way, we can meaningfully relate the institutional factors perceived by each individual to the TAM factors (i.e., perceived usefulness, ease of use, continued use).

In order to test our hypotheses, we tested the level of significance for all paths through bootstrapping and then the PLS algorithm following the instructions of Peng and Lai (2012) for PLS.

FINDINGS

Before proceeding to test the hypotheses, we checked for the absence of intra-class correlation. Figure 3 shows the results of the hypothesis testing; continuous arrows depict significant path, while dotted arrows display non-significant paths. As for the hypothesis testing, H_1 states that individuals embedded in institutional contexts with higher institutional pressures (i.e. organizational expectations and alignment of meaning systems towards technology use, and higher change culture) display higher rates of continued use of new ICT systems. As shown in Figure 3, the relationships between organizational expectations, alignment of meaning systems and organizations' change culture with continued use of EMR are all not statistically significant (respectively, β = -0,026; -0,045 and 0,149; t = 0,190; 0,321 and 1,266). As such, H_1 is not verified.
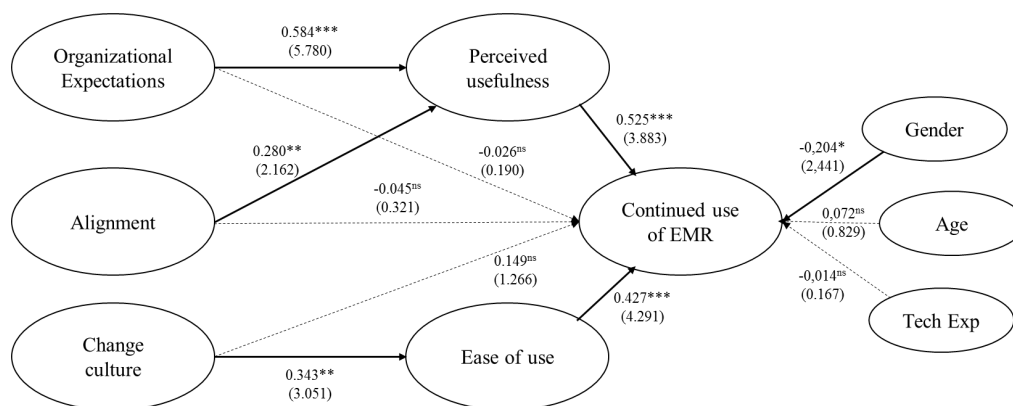
(*** p-value<0.001; **p-value<0.01; *p-value<0.05; the value of the test statistic is in brackets)

Figure 3: Path model results

H_2 states that individuals' perceived ease of use and perceived usefulness of a new technological system are positively correlated with its acceptance and continued use. Results confirms this hypothesis, since the relationships between perceived usefulness and continued use of EMR and of ease of use with continued use of EMR are both positive and statistically significant (respectively: β = 0,525 and t = 3,883; β = 0,427 and t = 4,291).

H_3 states that the institutional pillars (i.e. organizational expectations, alignment of meaning systems and change culture) are positively correlated with the professionals' perceived ease of use and usefulness. The results provide support to H_3. In facts, organizational expectations and alignment of meaning system are positively related to perceived usefulness of the EMR, and the relationships are statistically significant (respectively, β

= 0,584; 0,280; and t = 5,780; 2,162). Change culture is positively related to the perceived ease of use (β = 0,343; t =3,051).

Furthermore, results show that a negative and statistically significant relationship exists between continued use of EMR and the professionals' gender (β=-0,204; t = 2,441). Positive relationships exist between continued use of EMR and the age and technological experience (i.e. "Tech Exp" in Figure 3), though both are not statistically significant (respectively: β = 0,072 and t = 0,829; β = -0,014 and t = 0,167).

DISCUSSION

In hospitals, institutional and user acceptance theories do not represent orthogonal explanations of individual behaviours. Key features of professional work demand both institutional conformity and a demand of autonomous decision-making (Von Nordenflycht, 2010). Professionalized workforce in hospitals must conform to strict regulations on the nature and use of their expert knowledge, and must conform to established ideologies of service appropriateness. At the same time, professionals are expected to use their expertise to make complex decisions that might go beyond the boundaries of guidelines and care pathways (Abbott, 1988; Friedson, 1988; Suddaby and Viale, 2011).

Our study sought to better clarify the relationship between the two theories, i.e. if and how organizational expectations, meaning systems and change culture represent institutional factors *shaping* the perception of usefulness and ease of use toward isomorphism; or if they represent organizational factors *informing* the perception of usefulness and ease of use. Our main contribution is testing both configurations, and showing – against initial expectations – that the latter effect is prevailing.

The preponderant institutional studies dictated the initial expectations, showing that regulative, cultural and technical forces shape the way in which individuals conceive 'usefulness' and 'ease of use'. The institutional perspective provides an important conundrum. If individual decision-making is heavily shaped by the regulative, cultural and technical forces, professionals embedded in the same institutional context should display isomorphic perceptions of the 'usefulness' and 'ease of use' of new practices or technologies. The existence of heterogeneous forms of agency in a heavily institutionalized setting was traditionally conceived as a 'paradox' in this literature (Holm, 1995; Battilana and D'Aunno, 2009). If so: (i) a large chunk of professional work is the 'mindless' replication of the status quo and translation of institutionalized patterns into practice, and (ii) professional autonomy is less substantial as expected, as decision-making is informed primarily by macro-level regulations, social norms and taken-for-granted beliefs.

Our study did not find evidence of such isomorphism. Professionals developed distinct perceptions of organizational features and displayed different behaviours regarding EMR use. Indeed, organizational expectations, the alignment of meaning systems, and change culture were significantly linked to professionals' perceptions of ease of use and usefulness. The lack of isomorphic mechanisms suggests that these are organizational factors, which professionals process before developing their own perception of ease of use and usefulness. These results oppose the notion that professionals succumb 'mindlessly' to institutional pressures. Professionals are likely to use their status and knowledge to mediate the institutional pressures and make individual decisions about the new technology. Professionals are not entirely 'free' from these institutional pressures, as the assessment of EMRs is informed by organizational expectations, meaning systems and change culture.

We suggest that the nature and purpose of EMRs explain this result. In the absence of coercive mechanisms (i.e. the non-use cannot be sanctioned), institutional pressures toward EMR use are primarily normative (i.e., the organization has binding expectations about EMR use, with which professionals comply out of social obligation) and/or mimetic (i.e., EMRs fit with existing taken-for-granted beliefs and logics of action, so professionals should support their adoption) (Scott, 2003). None of these two effects are likely to be present with the introduction of EMRs.

First, EMRs do not fully fit with established logics of clinical appropriateness, i.e. they do not fully support them nor fully antagonize them. EMRs are promoted by early enthusiasts in the professional workforce as significant advancements to clinical appropriateness, and in particular to service quality, stability and reliability. At the same time, they are promoted by managers and policy-makers as sources of efficiency, standardization and constant monitoring. These logics are often regarded sceptically as managerial intrusion into professional practice (Llewellyn, 2001; Thomas and Hewitt, 2011). The ambiguous implications of EMR for service appropriateness are likely to increase professionals' attention toward the implications of the new technology. Professionals must act as 'arbiters of risk' (Currie et al., 2012), constantly monitoring the appropriateness of service changes as their morals, status and privileges depend on it (Abbott, 1988; Freidson, 1988). Hence, the perception of ease of use and usefulness are likely to play an expanded role in a professional context like hospitals. While other users might decide to 'play around' with new technologies, or at least experiment with them – professionals are likely to demand usefulness and ease of use to increase the appropriateness of their care. With technologies playing an instrumental role toward the broader goal of appropriateness, healthcare professionals appear particularly careful to rationalize the use of new technologies.

Second, healthcare professionals have remarkable power and status against managers and other professional groups, and they shield themselves from social obligations outside their peer group (Abbott, 1988; Llewellyn, 2001; Thomas and Hewitt, 2011). Earlier research has already evidenced that high-status professionals (i) regard with suspicion changes attempted by external actors – i.e. their rational and volition decision-making is triggered by new symbolic systems, relational systems and artefacts; and (ii) actively defend their autonomy against external attempts of institutional change by making key decisions about the use of tools and technologies (e.g. Currie et al., 2012; Micelotta and Washington, 2011).

In summary, organizational expectations, ad-hoc meaning systems, and a change culture are potential institutional carriers (Scott, 2001, 2003), which could stimulate the EMR use. However, the nature of 'who' carries such influence, and 'what' it is influenced explain why and how healthcare professionals play a mediating role in assessing the pros and cons of new technologies. Managers and IT enthusiasts carrying the institutional idea of diffusing EMR use are typically separated from (or even subordinated to) professional users – hence they have limited influence on their decision-making. Furthermore, the institutionalized logics of appropriateness are such that professionals watch carefully any innovation and change, and need to ask themselves if the addition increases or threatens the quality of care. As a result, professionals are likely to mediate institutional influences with their autonomous and complex decision-making.

LIMITATIONS

Despite the contributions, the study presents a number of limitations that future research might address. The cross-sectional nature of our study does not allow drawing definitive inferences on how and why professionals decided to use EMR, and how and why others

did not. While we adopted strong reasons from earlier research, future studies might implement theory-building studies to provide more detailed explanations. Furthermore, while the limited number of observations is sufficient to determine the lack of institutional influences on professionals' decision-making, we suggest that future studies aiming at more ambitious theory-building should use an expanded, and more heterogeneous, dataset. Finally, while healthcare is a paradigmatic context for generalizing our findings to other professional organizations (e.g., schools, consultancy companies, etc.), other, more traditional, organizations might present peculiar strategies to stimulate the use of new ICTs. We suggest that future studies might expand the set of organizations under investigation to increase the generalizability of results.

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