Professional Use of Electronic Medical Record: Rational and Institutional Factors Explaining IT Usage

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Structured Abstract

Purpose – The present study investigates the factors that directly affect the use of Electronic Medical Records (EMRs) among healthcare professionals. Findings will contribute to our understanding of which explanation (deterministic vs. institutional) might be the most relevant to directly predict adopters' behaviour, and whether institutional and rational factors are correlated, or represent two separate entities.

Design/methodology/approach – Our model incorporates constructs from the Technology Accepts Model, i.e. perceived usefulness and ease of use, along with constructs associated with institutional explanations, i.e. organizational expectations, technological culture and alignment of meaning systems. We surveyed the literature to identify valid measures for related constructs and adapted existing scales to measure the different constructs. We developed a questionnaire and collected data from four public hospitals in Northern Italy that are early adopters of EMRs. We have run a hierarchical regression to test our hypotheses.

Originality/value – The 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 technology use. Results reveal, in fact, significant direct and mediated relationships only for organizational expectations.

Practical implications – Comprehensively, our results provide healthcare managers with new insights on how to trigger and facilitate the adoption and the continuative usage of EMR within their operations. On the one hand, they have to understand how professionals evaluate the benefits and shortcomings of the innovations and provide them with clear, evidence-based information about EMRs. On the other hand, they cannot mandate change easily by means of top-down, hierarchical actions, but they can create the premises and the organizational facilitations that are conducive of change by professionals.

Keywords – Healthcare, Electronic Medical Record, Technology Use

Paper type – Academic Research Paper

1 Introduction

The fields of information systems and organizational studies have explained employees' use of new technologies and practices in two largely different ways.

Information systems research has mostly adopted user acceptance models that 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) which 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 (Adams et al., 1992; Venkatesh et al., 2003; Lu et al., 2005; King and He, 2006; Gupta et al., 2008; Lankton, McKnight et al., 2014; Walsh, 2014).

Differently, organization studies research has often incorporated structuralist and/or institutionalist explanations, which downplays the role of employees' volition and rationality and emphasizes instead how overarching structures, rules, social norms and culture shape individual behaviours and decisions (DeSanctis and Poole, 1994; Scott, 1995; Barley and Tolbert, 1997; Lewis et al., 2003; Butler, 2011; Currie, 2012).

These perspectives imply different strategies that organizations should pursue to engender the use of new information systems among its employees. While TAM-like models give premise to individuals' self-determination and suggest interventions that fit processes, structures and/or technologies with their perceptions of ease of use and usefulness, structuralist/institutional models emphasize the capacity of structures, rules, social norms and cultures to affect, and perhaps determine, what individuals regard as easy to use and useful.

Unfortunately, it remains still dubious if and how these two perspectives can be combined as well as if and how one perspective affects the other. Only few studies have tested both explanations in an integrative framework (e.g. Lewis et al., 2003) – and, in general, have mostly adopted the institutional perspective to explain the behaviour of organizations, not individuals (e.g. Messerschmidt and Hinz, 2013)

Our study draws upon this limitation to develop and test an empirical model that posits the effect of three institutional factors (management expectations, alignment of meaning systems, culture) on: (i) the TAM-derived variables of individuals' perceptions of ease of use and usefulness, and (ii) directly, professionals' continued use of a new IT system. In such

guise, findings will contribute to our understanding of which explanation (deterministic vs. institutional) might be the most relevant to directly predict adopters' behaviour, and whether institutional and TAM factors are correlated, or represent two separate entities.

The model is tested in the context of hospitals, and assesses professionals' use of Electronic Medical Records (EMRs). Hospitals are peculiar and exemplary settings to test our model, since past research strongly support both TAM-related and institutional factors – and indirectly maximize doubts on how they are connected.

On the one hand, in fact, the 'sociology of professions' describes professionals as powerful employees, who leverage their unique and tacit knowledge to make independent decisions from managers' and peers' influence (Abbott, 1988; Friedson, 1988; Armstrong, 2002; Walter and Lopez, 2008; Boonstra and Broekhuis, 2010; Thomas and Hewitt, 2011) – which would altogether suggest that professionals' rational and volitional behaviour, and thus the prominence of TAM-like models. At the same time, professional organizations, and hospitals in particular, have been the prominent locus of investigation for institutional theory studies – an element which emphasises, instead, the strength of institutional influences on managers' and professionals' decision-making (Young et al., 2001; Currie and Suhomlinova, 2006; Battiliana, 2006; Kennedy and Fiss, 2009).

With the conundrum between TAM and institutional theory as high as possible in this setting, our study thus aims to derive also practical implications for more effective IT adoption.

2 Theoretical Background

In this section we develop hypotheses about: (i) the direct link between employees' perceived ease of use and usefulness and their use of a new IT system; (ii) the direct link between institutional factors and employees' use of a new IT system; (iii) the link between institutional factors and employees' perceptions of ease of use and usefulness.

2.1 Ease of Use, Usefulness and Use

Several studies in IS 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; Lu et al., 2005; King and He, 2006; 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 (Mohd and Syed Mohamad, 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, without further need for theorizing:

H_1: *Individuals' perceived ease of use and perceived usefulness of a new IT system are positively correlated with its continued use*.

2.2 Institutional Theory and Institutional Factors

The institutional theory provides a socialized account of human agency, which suggests that local behaviours are oriented, or even constrained, by overarching structures and norms in the field or in the organization (Scott, 1995, 2001; Tolbert and Zucker,

1999; Dacin et al., 2002; Lawrence et al., 2009). Institutions are conceived as "relatively enduring systems of social beliefs and socially organized practices" (Scott, 1987, p. 499) that justify and rein-force "observable pattern of collective action" (Czarniawska, 2009). Scott (1995, 2001, 2008) suggested that individuals' agency is affected differently by three "institutional pillars", i.e. (i) regulative pillars, such as rules, monitoring and sanctioning activities, which coerce action; (ii) normative pillars, such as social norms which stress what are 'appropri-ate' and 'instrumental' behaviours for the individual, and (iii) cultural-cognitive pillars, which guide individuals' meaning and symbolic systems.

We translate empirically this argument by focusing on the impact of regulative, normative and cultural-cognitive pillars that might affect the acceptance and use of EMRs. We approximated them in terms of (i) organizational expectations (e.g. plans, budget indications), which represent how the organization pursues a semi-coercive mechanism, in the absence of rules that could compel professional employees to use EMR; (ii) the alignment of meaning systems, i.e. if and how professional groups and executive management (i.e. the main proponents of EMR in our settings) have aligned individual professionals' meaning systems regarding daily and professional priorities; (iii) technological culture, which represents efforts made by proponents of EMR to get professionals attached to the use of new technologies as part of their normative system.

Drawing upon the main arguments from institutional theory, we thus hypothesize that the-se proxies of institutional factors would directly affect individuals' use of EMR:

H_2: *Organizational expectations, the alignment of meaning systems, and technological culture are positively correlated with the continued use of a new IT system*.

2.3 Institutional Factors Affecting Individuals' Decisoin Making

Hypothesis 2 assumes that individuals would use EMRs beyond, or even without, a rational assessment of its advantages. If unmediated by a user acceptance model, that hypothesis would suggest that individuals do not decide to use an EMR, but are rather induced/urged by institutional factors. A less radical view would assume instead that institutional factors affect individuals' decision making, rather than their behaviours, i.e. institutional factors affect how they perceive the ease of use and/or usefulness of a new technology, but individuals still rationalize its use according to these two elements.

This interpretation is consistent with more recent interpretations of Institutional Theory that argue that the "iron cage" (DiMaggio and Powell, 1983) generated by institutional factors leaves enough room to organizations and individuals to think rationally about alternatives (cf. also Tolbert and Zucker, 1999; Dacin et al., 2002; Pozzebon, 2004; Lawrence and Suddaby, 2006; Lawrence et al., 2009). As Battilana and D'Aunno (2009) argued, institutions are not "cognitively totalizing structures [and] even when actors are subject to institutional influences, they can develop a practical consciousness" (p. 47).

The authors suggested that human agency is open to critical reflection because it is "informed by the past (in its habitual aspect), but also oriented toward the future (as a capacity to imagine alternative possibilities) and toward the present (as a capacity to contextualise past habits and future projects within the contingencies of the moment)"

(ibid.). Importantly, this consciousness is a property of all social agents (Hallett and Ventresca, 2006; Lawrence and Suddaby, 2006; Delbridge and Edwards, 2013).

Drawing upon these considerations, 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 Technology Acceptance Model, 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 technological culture are positively correlated to individuals' perceived ease of use and usefulness*.

2.4 Control Variables

Past research has extended user acceptance models with task-technology fit constructs, under the premise that individuals would use more a new information system if it is coherent with the task they have to perform and with the processes they are embedded in (Goodhue et al., 1995; Dishaw and Strong, 1999; Ammertwerth et al., 2006). Given the extensive validation of this typology of construct, we included a control variable, labelled "coherence with work processes" to explain the continued use of a new IT system. We do not hypothesize, however, that institutional factors affect this variable.

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

3 Research Methodology

3.1 Questionnaire Design, Measures and Control Variables

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, technological cultures and alignment of meaning systems respectively from Ajzen (1991) Khoja et al., (2007) and Ravlin and Meglino (1987). Regarding the "coherence with work processes", we used scales derived from Ammertwerth et al. (2006). All indicators were measured using a seven-point Likert scale.

Since the scales drawn from the literature were in English, the initial questionnaire was developed in English, then translated into Italian by an EMR expert in Italy. The Italian version was then translated back into English by another expert, and the translated English version was checked against the original English version for discrepancies.

There were two preliminary assessments of the questionnaire. First, we submitted it to academics in the field of digital innovation in healthcare for their review. Next, we pretested it in a hospital, which we visited to conduct face-to-face discussions. 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 practitioners. The complete scales are listed in Table A.1, in the Appendix.

3.2 Sampling and Data Collection

Data were collected from four public hospitals in Northern Italy that are early adopters of EMRs. To obtain a representative sample, we relied on the investments made in EMR from 2008 to 2013 by more than 100 Italian hospitals. The four selected hospitals are not only among the first Italian hospitals having invested in EMRs, but also the ones with the most mature systems according to 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 physicians and nurses who extensively used the EMR throughout their daily activities as convenient respondents.

We mailed the questionnaire to the respondents, along with a cover letter highlighting the study's objectives and potential contributions. 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. A profile of the respondents is presented in Table 1.

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. Since there were more than one informant per each hospital, the potential for common method bias was not assessed.

Table 1. Respondents' main characteristics

Hospital	Respondents (male/female)	Females respondents	Technological experience [A]	Org. seniority (in years)	Respondent age (in years)
Hospital 1	34	14	18.91	15.67	48.88
Hospital 2	9	8	14.00	21.89	47.78
Hospital 3	4	4	17.50	27.75	49.75
Hospital 4	13	0	9.54	17.54	39.83
Overall/ average	60	26	16.00	17.85	46.86

[A] *Measured in years of PC utilisation*

[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.*

3.3 Reliability, Unidimensionality and Validity

Each variable's cumulative proportion was plotted against the cumulative proportion for several test distributions, revealing that the data appeared to be approximately normally distributed. The scales were all reliable, with six values of Chronbach's alpha higher than 0.7 (Nunnally, 1978). Only one construct had an alpha slightly falling close but below this threshold value—the technological culture (0.6757)—, but it was considered acceptable.

Table A.1, in the Appendix, reveals that all items had strong loadings on the construct that they were intended to measure. The results of the exploratory factor analysis also indicate that all items have lower loadings on the constructs that they were not intended to measure. These results demonstrate construct unidimensionality.

Content validity was established through a domain search of the literature, careful synthesis and critical evaluation of existing constructs and an iterative construct review by domain experts. All factor loadings were greater than 0.50, the t-values were all greater than 2.0, and each item's coefficient is greater than twice its standard error (Anderson and Gerbing, 1988). Thus, our constructs have also converged validity.

4 Findings

First, we have analysed the possible correlations between the constructs of our model. Table 2 resumes all combinations. We considered meaningful all the correlations with a value greater or equal to 0.5. An analysis of Table 2 reveals that:

- The control variable coherence with processes is correlated with the dependant variable (0.63) and with perceived personal usefulness (0.61) and ease of use (0.61);
- The institutional construct relative to organisational expectations is correlated to the TAM construct relative to perceived personal usefulness (0.52);
- The dependant variable (EMR continued use) is correlated to TAM factors perceived personal usefulness (0.63) and perceived ease of use (0.57), and to institutional factor organisational expectations (0.60).

We have run a hierarchical regression to test the hypotheses. For each variable, scale averages were used in the model. The first hypothesis has been tested through the models depicted in Table 3. According to Model 1, gender and coherence with processes affect the EMR continued use. The resulting percentage of total variation of EMR use explained by the model appears good ($R^2 = 0.49$; $F = 8.51$). Model 2 increases the explanatory power of the regression ($R^2 = 0.60$; $F = 10.83$). This increase should be attributed to the variable personal usefulness.

Table 2. Descriptive statistics and correlations

Variable	Obs	Min	Max	μ	Σ	1	2	3	4	5	6	7	8	9	10
1. Gender [A]	59	0	1	0.58	0.49										
2. Technological experience [B]	59	4	30	16	7.15	–0.04									
3. Organisational seniority [C]	59	1	39	21.75	9.95	–0.11	0.06								
4. Respondent age [B]	57	22	63	46.86	9.78	–0.09	0.26	0.78							
5. Coherence with processes	56	–1.41	1.27	0.01	0.66	0.17	0.39	–0.34	–0.23						
6. Organisational expectations	56	–2.05	1.04	–0.03	0.82	–0.22	0.02	–0.01	–0.02	0.39					
7. Alignment of meaning systems	57	–2.02	1.26	–0.03	0.82	0.07	0.27	–0.07	–0.07	0.42	0.08				
8. Technological culture	56	–2.60	1.19	–0.01	0.86	–0.04	0.00	0.12	0.19	–0.09	0.29	–0.10			
9. Personal usefulness	60	–2.27	1.15	0.01	0.76	0.28	0.18	–0.23	–0.04	0.66	0.52	0.40	–0.06		
10. Perceived ease of use	55	–1.76	1.35	0.01	0.73	–0.01	0.18	–0.42	–0.35	0.61	0.33	0.08	–0.04	0.43	
11. EMR continued use	55	–2.17	1.05	–0.01	0.82	–0.15	0.32	–0.10	0.02	0.63	0.60	0.23	–0.00	0.63	0.57

[A] 0 = Female; 1 = Male
[B] Measured in years (of PC utilisation in case of technological experience

Table 3. Results of regression analyses conducted to test H_1

Variable [A]		Model 1	Model 2	Model 3	Model 4
Control variables	1. Gender	–0.42* (0.17)	–0.52** (0.16)	–0.34 (0.17)	–0.45** (0.16)
	2. Technological experience	–0.00 (0.01)	0.01 (0.01)	–0.00 (0.13)	0.01 (0.13)
	3. Organisational seniority	–0.00 (0.01)	0.01 (0.01)	0.00 (0.14)	0.01 (0.13)
	4. Respondent age	0.02 (0.14)	0.00 (0.14)	0.02 (0.01)	0.00 (0.01)
	5. Coherence with processes	0.85*** (0.15)	0.45* (0.18)	0.63*** (0.17)	0.29 (0.19)
Institutional factors	6. Organisational expectations				
	7. Alignment of meaning systems				
	8. Technological culture				
TAM factors	9. Personal usefulness		0.47*** (0.14)		0.43** (0.13)
	10. Perceived ease of use			0.37* (0.15)	0.30* (0.14)
Constant		–0.39 (0.47)	0.00 (0.44)	–0.67 (0.46)	–0.26 (0.44)
R^2		0.49	0.60	0.55	0.64
F		8.51	10.83	8.87	10.80

[A] All regressions are made on EMR continued use; standard errors are in parentheses; * $p < 0.05$; ** < 0.01; *** $p < 0.001$; technological experience measured in years of PC utilisation; organisational seniority and respondent age measured in years

In model 3 we excluded personal usefulness and we introduced the variable perceived ease of use. This variable has less explanatory power than personal usefulness ($R^2 = 0.55$; F = 8.87), but is still significant. Model 4 tests all control variables and both the two TAM factors. With respect to the previous models, it is possible to notice an increase in the percentage of variance explained ($R^2 = 0.64$) and model fit (F = 10.80, slightly inferior to the F value of Model 2). Personal usefulness and perceived ease of use are confirmed as determinants in supporting EMR continued use. Hypothesis 1 is thus fully supported. It is interesting to emphasise the significance of gender in explaining the variance of EMR use.

To test the second hypothesis we leveraged on the four models depicted in Table 4. In models 5, 6 and 7 we tested the explicative power of each single institutional factor in explaining the dependant variable. In model 8 we tested all three institutional factors together. With respect to Table 4, it is possible to notice that Model 8 increased the percentage of variance explained ($R^2 = 0.60$), but decreased model fit to data (F = 7.60, inferior to the F value of Model 1). Only organisational expectations and coherence with processes are significant in explaining the variance of EMR continued use. Overall, hypothesis 2 cannot be accepted.

Table 4. Results of regression analyses conducted to test H_2

	Variable [A]	**Model 1**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
Control variables	1. Gender	–0.42* (0.17)	–0.23 (0.179	–0.42 (0.18)	–0.17 (0.11)	–0.21 (0.17)
	2. Technological experience	–0.00 (0.01)	0.01 (0.01)	–0.00 (0.01)	–0.00 (0.02)	0.01 (0.1)
	3. Organisational seniority	–0.00 (0.01)	–0.01 (0.01)	–0.00 (0.01)	–0.00 (0.15)	–0.01 (0.14)
	4. Respondent age	0.02 (0.14)	0.13 (0.13)	0.01 (0.01)	0.15 (0.02)	0.02 (0.p1)
	5. Coherence with processes	0.85*** (0.15)	0.58*** (0.16)	0.87*** (0.16)	0.86*** (0.16)	0.55** (0.18)
Institutional factors	6. Organisational expectations		0.38** (0.12)			0.43** (0.13)
	7. Alignment of meaning systems			–0.04 (0.12)		–0.01 (0.11)
	8. Technological culture				0.02 (0.11)	–0.11 (0.10)
TAM factors	9. Personal usefulness					
	10. Perceived ease of use					
Constant		–0.39 (0.47)	–0.50 (0.43)	–0.39 (0.50)	–0.38 (0.49)	–0.59 (0.45)
R^2		0.49	0.59	0.49	0.49	0.60
F		8.51	10.38	6.97	6.76	7.60

[A] All regressions are made on EMR continued use; standard errors are in parentheses; * $p < 0.05$; ** < 0.01; *** $p < 0.001$; technological experience, organisational seniority and respondent age measured in years

In order to test hypothesis 3 we had to consider the institutional factors as distal antecedents of the TAM factors, which are considered proximal variables of EMR continued use. The three models in Table 5 allowed testing the hypothesis. In Model 9 we found a strong positive effect of organisational expectations on personal usefulness (R^2 = 0.68; F = 11.22). Also gender, the coherence with processes and respondent age explained the variability of the personal usefulness. In model 10 we did not found any institutional factors as distal antecedents of the perceived ease of use of the EMR. Only the coherence with processes seams significant in explaining the variance of this variable. In model 11 we run a comprehensive regression with the EMR continued use as dependant variable and all the antecedents, both proximal and distal, as independent variables. Among TAM factors, only the perceived ease of use is statistically significant, whereas distal institutional factors have no noticeable effect on EMR use, as we expected to be. Overall, model 11 has the biggest explanatory power of all models considered (R^2 = 0.68) but model fit is not optimal (F = 8.01). Thus, hypothesis 3 is only partially accepted.

Table 5. Results of regression analyses conducted to test H_3

	Variable [A]	**Model 1**	**Model 9**	**Model 10**	**Model 11**
Control variables	1. Gender	–0.42* (0.17)	0.49** (0.15)	–0.15 (0.18)	–0.32 (0.18)
	2. Technological experience	–0.00 (0.01)	–0.01 (0.01)	0.00 (0.01)	0.01 (0.01)
	3. Organisational seniority	–0.00 (0.01)	–0.03 (0.01)	–0.01 (0.01)	0.00 (0.01)
	4. Respondent age	0.02 (0.14)	0.32* (0.12)	–0.01 (0.01)	0.01 (0.14)
	5. Coherence with processes	0.85*** (0.15)	0.43** (0.16)	0.62** (0.18)	0.25 (0.20)
Institutional factors	6. Organisational expectations		0.48*** (0.11)	0.08 (0.13)	0.25 (0.15)
	7. Alignment of meaning systems		0.14 (0.09)	–0.17 (0.11)	–0.01 (0.11)
	8. Technological culture		–0.17 (0.09)	–0.00 (0.11)	–0.06 (0.10)
TAM factors	9. Personal usefulness		Dependant variable[B]		0.31 (0.17)
	10. Perceived ease of use			Dependant variable[B]	0.30* (0.14)
Constant		–0.39 (0.47)	–1.05* (0.39)	0.69 (0.50)	–0.44 (0.48)
R^2		0.49	0.68	0.49	0.68
F		8.51	11.22	4.74	8.01

[A] All regressions are made on EMR continued use; standard errors are in parentheses; * $p < 0.05$; ** < 0.01; *** $p < 0.001$; technological experience measured in years of PC utilisation; organisational seniority and respondent age measured in years

[B] We indicate the dependant variable when it is not the EMR continued use

5 Discussion

Preliminary results suggest two main issues worth of discussion.

First, for healthcare professionals, EMR use is primarily explained by rational and volitional mechanisms, such as the perceptions of usefulness and ease of use. These results provide support to deterministic models of technology acceptance, such as TAM and UTAUT.

Even when they are early-adopters, professionals ground decision-making on the actual benefits new technologies might bring to their practice and to their patients without being distracted by innovative features per se. This result confirms the necessity to distinguish professionals from generic adopters and the need of further research that explore the interdependency between individual choice and collective professional values.

Furthering this discussion, results also show that the perceived usefulness of EMR for the organization is not correlated with its use—thus providing support also to the notion that professionals follow different goals from managers and move, for the most part, independently from organizational considerations.

The role of managerial expectation in affecting personal usefulness possibly suggest that managers might move professionals towards the use of new technologies by highlighting the personal advantages that professionals can obtain through that use – thus suggesting that managers might need to move towards professionals' logics and goals and not vice versa.

Second, our results do not support a structuralist interpretation of the adoption of innovative technologies by professionals since they do not directly affect EMR use. In this regard, key for our contribution is the notion, endorsed by more recent studies in the stream, that organizations and individuals do not passively withstand the influence of these "institutional pillars", but can also actively engage in their creation or modification (Maguire et al., 2004 Battilana, 2006; Lawrence and Suddaby, 2006, Lawrence et al., 2009, Battilana, Leca and Boxenbaum, 2009; Suddaby and Viale, 2011; Currie et al., 2012).

Put differently, organizations can strategically perform institutional work, i.e. "the purposive action of individuals and organizations aimed at creating, maintaining and disrupting institutions" (Lawrence and Suddaby, 2006), to support individuals' adoption and use of new practices. Differently from strategies grounded on user acceptable models – which change contexts, processes and technologies to fit with individuals' perceptions of ease of use and usefulness –, an "institutional work" strategy would change contexts, processes and technologies to orient and modify what individuals perceive as easy to use or useful.

This finding is also coherent to previous research that showed how professionals' core values, attitudes and behaviours are shaped outside of the organization they work for because they are brought from their professional environment, such as from scientific associations, teaching hospitals etc. In this regard, further research should explore which other institutions could influence the healthcare professionals' perceptions about ease to use and usefulness.

6 Conclusions

Comprehensively, our results provide healthcare managers with new insights on how to trigger and facilitate the adoption and the continuative usage of EMR within their operations.

On the one hand, hospital managers should acknowledge that professionals engage into a rational decision-making when adopting new technologies. In this regard, they have to understand how professionals evaluate the benefits and shortcomings of the innovations and provide them with clear, evidence-based information about EMRs. Moreover, they have to consider professionals are aimed at delivering significant value to their relevant stakeholder, i.e. the patient, and might be indifferent—if not resistant—to innovations that have a limited ease of use and that require significant opportunity costs in terms of time necessary to learn the adequate use of the new technology.

On the other hand, hospital managers should acknowledge that professionals shape their core values, routines, attitudes, and behaviours outside of the institutional context they work within—i.e. the hospital—and in this view they are not subjected to institutional pressures. This confirms that managers cannot mandate change easily by means of top-down, hierarchical actions, but they can create the premises and the organizational facilitations that are conducive of change by professionals.

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Appendix

Table A.1. Measurement items (with factor loadings)

Construct [A]	**Measurement item** [B]	**Loadings**
Coherence with processes (0.7952)	The data included into the EMR are sufficient to make me do effective decisions	0.7640
	The EMR does not consider data that are critical for the accomplishment of my job [C]	0.7700
	The EMR simplify the tasks that I've to accomplish	0.7370
	The EMR slows down the accomplishment of my job	0.7862
	Using the EMR allows me to quickly reach the data I need for accomplish my job	0.7627
	Sometimes I have doubted the consistency of the data included in the EMR [C]	0.7649
	It is often hard to compare EMR data with other data that I own [C]	0.7935
Organisational expectations (0.8009)	My healthcare organisation expect me to use the EMR	0.8957
	My most esteemed colleagues believe that I should regularly use the EMR	0.6875
	My most esteemed colleagues regularly use the EMR	0.6909
	My best colleagues believe that the EMR usage is essential for the organisation	0.6816
Alignment of meaning system (0.7260)	I often disagree with the decisions of my C-levels regarding the EMR [C]	0.7386
	I often argue with my professional group regarding my daily priorities [C]	0.6526
	I often disagree with the decisions of my collagenases regarding how to work [C]	0.7260
Technological culture (0.6757)	It is long time since this org. exploits ICT to improve its clinical activities	0.5001
	There is a widespread opinion that this org. can not help but adopt ICTs	0.5131
	Within this org. we often discuss the opportunities offered by ICTs	0.7064
Personal Usefulness (0.7717)	Using the EMR enable me to accomplish tasks more quickly	0.6179
	The usage of EMR significantly enhance my effectiveness in my job	0.6272
	The usage of EMR significantly improve my productivity	0.6759
	The EMR adoption considerable complicated the accomplishment of my tasks [C]	0.8734
Perceived ease of use (0.7802)	It has been easy to me to become skilful at using the EMR	0.6870
	I can get the EMR to do what I want to do	0.6896
	I have problems in interacting with the EMR [C]	0.8536
	The EMR is easy to use	0.7066
	In a short period of time I have became an expert in using the EMR	0.7233
EMR continued use (0.8130)	Using the EMR has become an habit for me	0.7300
	I can not help but used the EMR	0.7585
	Using the EMR is natural to me	0.7547
	I often fill the medical record of a patient in a paper format [C]	0.8122

[A] *For each construct we have reported (in the parentheses) the Cronbach's alpha of the relative items*
[B] *All items were measured on a 7-point Likert scale, where 1 = strongly disagree, 2 = moderately disagree, 3 = somewhat disagree, 4 = neutral, 5 = somewhat agree, 6 = moderately agree, and 7 = strongly agree*
[C] *The question is written in negative form to strengthen the representativeness of collected data*