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Professional facing coercive work formalization: vicious circle of the Electronic Medical Record (EMR) implementation and appropriation

D. MORQUIN[a], OLOGEANU-TADDEI[b*]

[a]*Infectious and Tropical Diseases Department, Gui de Chauliac, University Hospital of Montpellier, 34090 Montpellier, France*
[b]*Montpellier Research in Management, University of Montpellier, 34090 Montpellier, France*
[c]*Grenoble School of Management, 38000, Grenoble, France*

Abstract

This paper shows that, according to many studies, the implementation of the Electronic Medical Record (EMR) does not cause efficient uses as expected in hospitals. Authors suggest explanatory factors, including both generic factors related to the implementation of ERP and specific factors related to health sector, in particular to professional bureaucracies (professional autonomy, divergence of goals, lack of coordination). The paper highlights the risk of a vicious circle of clinical process computerization, similar to bureaucratic vicious circle described by Crozier (Crozier 1965). Specifically, the convergence of two information systems, the clinical one and the administrative one inside the EMR, is a source of conflict between two logics, one focused on the professional to manage the care of a given patient, and the other focused on the resources management for all patients. The dominance of the administrative logic, consisting in monitoring and promoting coercive formalization, is likely to reduce the professional adjustment and autonomy, to cause their resistance and, consequently, the absence of effective uses, which lead back a strengthening of the control logic. The author shows interest to consider this conflict to reverse the situation by enabling approach, using professional autonomy as lever.

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* Corresponding author. Tel.: +334 67 14 48 77
 E-mail address: roxana.ologeanu-taddei@umontpellier.fr

1. Introduction

Information technologies are more and more used to follow up hospital activities, physical flows (as patients and drugs) and information flows related to patient care process [1].

On the one hand, Electronic Medical Records (EMR) allow monitoring patient data (such as vital signs, laboratory data, radiology, patient care notes) provided by various sources and incorporating these data into a template that facilitate medical reasoning and reporting (consultation, hospitalization and medical consultation summaries) and order entry for treatments, examinations and appointments. On the other hand, computerized hospital information systems provide data for billing and management of all available resources such as beds, human resources, pharmaceutics or technical products, technical and operating room. Both of them are designed for traceability of actions, usually incorporating additional functionalities as alerts, decision support, balanced scorecard and best practices guidelines.

EMR directly support clinicians' current practices inside a hospital and have to fit real-time medical work processes [2] while the seconds support functional activities as accountability. However, the risk of errors related to double entries and redundancy among different specific software (designed for each specialty or each organizational function) stressed the need for a cross-functional software, on the model of Enterprise Resource Planning (ERP), related to a unique data base of patients' identifiers. The stated objectives of integrated software are various [3] as follows: providing reliable data, accuracy of patients' identification, preventing duplicate data entry and related errors, improving traceability of acts and drugs, optimizing care management by facilitating availability of patient records for caregivers. Nevertheless, the complexity of the implementation of EMR is obvious in literature and resistance of clinical staff, particularly of physicians, is considered as a major barrier to EMR implementation. Several authors consider hospital does not adequately drive organizational changes to facilitate physicians technology acceptance and to get all benefits related to EMR [4].

Our hypothesis is integration of clinical information system for caregiver covering administrative functions (billing, patients and resources schedules) blurs the medical and the administrative boundaries, driving to a conflict between professional and bureaucratic logics [5], between control and autonomy.

Our theoretical paper highlights that such integration, leading to work formalization and injunction to use, can be a threat for professional autonomy and physicians' medical dominance and, thus, negatively impact EMR appropriation. We argue management of the clinical information system has to avoid vicious circle of coercive implementation, driving to physicians' resistance, causing back more coercive implementation. We suggest management has to deal with a subtle mix of coercive and enabling logic to realize and assess fundamental objectives like quality of care and efficient clinical practices.

2. Relevance of an information technology: its use and data quality

Many positive goals explain why the Organization for Economic Co-operation and Development (OCDE) consider IT as one of the most important pathway to improve healthcare : decrease medication errors rate, financial gains, better quality of care, improved performance and greater safety[6]. However, EMR implementation is still considered as high-risk failure [7]. Furthermore, computerization of medical process has led sometimes to unintended consequences [8], as increased time dedicated to the prescription and prescription errors [9] and dangerous workarounds [10]. Research on EMR pointed out same problems already highlighted for ERP implementation [11, 12], as inadequate training [13] insufficient change management, poor ergonomics, and also misfit to workflows [14].

Availability of a technology does not determine the right use. Previous research showed technologies exist only in use, as technology-in-practice [15]. Furthermore, information technologies required proactive use and accurate data [16]. This means information recorded in an EMR is relevant for a care giver in management care process only if it is available and accurate (for example, real time information related to prescribed and administrated drugs). The assessment of the information relevance may be different for different caregivers and for administrative employees.

Medical information in the electronic records must be reliable, exhaustive and unique; thus, missing data cannot be accepted for critical steps as anesthesiology process. Both care managers and accountability departments need data on prescription and administration drugs but not at the same time limit. Caregivers need real-time data because of the sequential interdependence[17] of care management process.

A systematic review of literature has shown the complexity of the implementation of EMR, requiring to consider context, type of the software package used and project management [18].

Culture of healthcare givers as end-users may be described by four values, meaning quality of care, efficiency of clinical practices, physicians' medical dominance, professional status and autonomy – These values explain the level of difficulty of a clinical information system implementation [19].

3. Characteristics of professional organization impacting IT implementation

3.1. Professional autonomy

Walter and Lopez defined professional autonomy as "professionals' having control over the conditions, processes, procedures, or content of their work according to their own collective and, ultimately, individual judgment in the application of their profession's body of knowledge and expertise"[6]. They demonstrated that for physician users, a sophisticated system would not be adopted if the system does not follow the natural flow of a physician's work, or if it can be perceived by the physician user as threatening to his or her professional autonomy. Their results were similar for Clinical Decision System support and EMR. Culture of healthcare givers as end-users may be described by four values, meaning quality of care, efficiency of clinical practices, physicians' medical dominance, professional status and autonomy – These values explain the level of difficulty of a clinical information system implementation [19].

Physicians differ from other types of IT users investigated in the literature [20] and Mantzana et al. insist on the high importance of "the actors' views since their actions can have a great impact on Hospital Information Systems adoption" [21].

3.2. Mutual adjustment and difficulties to standardize patients care flows and management

Patients care management is constituted of very heterogeneous care workflows in a complex continuum. Some workflows may be standardized (i.g, cataract surgery), while others on the contrary justify a very high level of customization (overall treatment of an elderly with multiple comorbidities)[22]. Usually, the patient care management is not based on a single process, but on a combination of sub processes [23] whose referent physician is similar to a bandmaster. His or her expertise allows mutual adjustment among different players (others physicians or radiologists or biologists) based on limited resources (availability of technical equipment, or of beds), emergency degree (prioritization of resources by each unit manager) and especially unpredictable events. If each sub process can be modeled (i.g. performing a lumbar puncture), the whole journey of a patient can be extremely complex to model depending on the occurrence of adverse effects and multiple pathologies, or human factors (as refusal or misunderstanding of care by the patient, information and communication to family). Patients care modeling required for EHR design is possible for a small number of patients and thus often constitutes the exception and not the norm.

3.3. Challenge of intra and et interprofessionals coordination

Several issues have been associated with professional bureaucracy and described by Mintzberg [5]: except self-regulation through peer review, there is almost no control over work and no way to correct the deficiencies on which these same professionals choose to close their eyes ; professionals tend to overlook the essential problems of coordination, control and organizational innovation ; the standardization of qualifications is not sufficient to solve coordination problems between professionals and logistic support functions or especially between the professionals themselves; the autonomy of professionals encourages many of them to ignore the goals of the organization. For many of them the organization is accessory, as just a convenient place to practice. Professionals consider themselves being loyal to the profession but do not necessarily feel part of their institution and are not necessarily involved in organizing.

4. Implementation of hospital information system on the razor's edge of enabling and coercive logic

4.1. The workflow formalization induced by technology can be coercive or enabling

On the one side, workflow formalization can trigger decreasing commitment and job satisfaction, deskilling, alienation and brakes to innovation. On the other side, workflow formalization can increase autonomy, reduce role conflicts and stress at work [24] and facilitate innovation when it allows learning from experience and it facilitates coordination for the implementation of important projects [25]. Technology design and implementation cannot be neutral, because it is based on algorithms design, codes and thus a representation of workflows. Various authors distinguish between coercive and enabling technologies: the one is designed to enhance deskilling and is focused on the technology features while the other is based on the users' skills and capabilities [24, 26].

This distinction may be related to the technology design or to the implementation. When technologies are designed for automating decisions, whose aims are fool-proofing and deskilling rationale, they are coercive [24, 27]. The rationale is that "user is a problem to be eliminated" and a source of error [24]. When managers fear the opportunism of employees and they do not trust employees, they adopt a deskilling approach [24]. On the opposite, technologies are enabling when they are designed to enhance users' capabilities and skills. In other words, technology is thus designed for empowerment and not for enslavement [28], according to the rationale that user is "a source of skill and intelligence to be supported" [24]. The same distinction may be extended to implementation process [29].

We argue coercive design and implementation is driven according to administrative logic, related to unclearness between administrative and medical boundaries inside the clinical information system.

4.2. Design of Hospital information system and EMR: medical or administrative logic?

Computerization of medical records has constrained physicians to replace their own clinical information system.

To elaborate diagnosis, a physician draws his or her information system through his or her representation of patients and their diseases. For this, he or she assesses medical observation, meaning patient symptoms, clinical signs and laboratory tests, prioritizes and selects relevant information for medical decision-making and asks for advice to peers if necessary. Even if this information is partly medical routine, the way they are is represented and putted together is often specific to each specialty and even every physician. Organizing these elements is the core of medical reasoning. Related to type of design and implementation, enabling EMR may assist physicians to elaborate a convenient representation of a medical situation, while coercive EMR misfits medical and care management workflows, according to the standardization of medical and care management process as drawn by administrative logic.

When a therapeutic is decided, information system must provide all the information related to medication, isolation precautions or further investigations to all the caregivers. A physician may adapt medical decision only if he or she can follow back relevant information and monitor the effects of his or her decisions, taking into account evolution of patient's disease (current administration of the treatment, test results, vital signs). The EMR can be the backbone of the collaborative care and can increase or conversely decrease for the physician his capability to master and manage medical decisions related to patient's care process.

Transposition or computing model of care process is related to the formalization of medical work. If the system does not enable physician to act as a bandmaster, it will be perceived as coercive and as a threat to professional autonomy.

4.3. Risk of vicious circle

If literature shows EMR adoption and proactive use requires preventing physicians' autonomy, this condition is a concern for EMR designed for each specialty. A clinical information system, involving all the medical and care occupations, requires intra and interprofessional coordination. Furthermore, administrative and top management need accountability of available resources (as beds, human resources, pharmaceutics or technical products, technical and operating room) and measure of quality and efficiency indicators, which may be rejected by physicians. For these reasons, implementation management tends to be coercive. Doing this, it misfits medical and care workflows and can cause physicians resistance and negative unintended consequences as exposed by literature. Administrative managers

then react by strengthening formalization and process standardization and, thus, increase the gap between the required enabling design and implementation and the effective clinical information systems. This is a vicious circle, similar to bureaucratic circle described by Crozier 30 that may be broken by change management of practices focused on coordination.

Crozier showed the characteristics of bureaucratic organization (development of impersonal rules, centralization of decisions, isolating each hierarchical category and development of parallel power relationships) tend to the development of new pressures that reinforce the climate of depersonalization and centralization and lead to a vicious circle. We suggest that the lack of effective uses of EMR is likely to result in a strengthening of the control logic, justified by arguments of economic performance, which is likely to enhance the resistance in return for users and to maintain a situation of 'inefficient uses. More so, when the finding of the mismatch between promises of technology and actual use is effective, it can be tempting for the decision maker to believe, as a form of magical thinking, that the implementation of a new technology suffice to overcome this phenomenon without trying to understand the cause

5. Conclusion

We have shown in this paper the implementation of EMR reflects the principle of integrated software as in other economic sectors. It makes coexist features corresponding to different logics: one bureaucratic or managerial control, and another professional (clinical). Thus, the EMR crystallizes the very functioning of professional bureaucracies, characterized by the opposition between these two logics. But the inherent formalization caused by computerization (in terms of design or functional setting post-implementation) requires defining the processes and procedures to formalize, with clear objectives. Another characteristic of bureaucracies, namely the chaos associated with the divergence of goals defined by Hodson & Martin, reinforces this phenomenon, with the risk of a lack of adoption of EMR by professionals and therefore not appropriation. Yet only appropriation by professionals, and thus the development of what we call "effective use" is likely to cause an improvement in both the hospital organization and working conditions for each professional involved in the realization of care.

The main contribution of this paper is theoretical. It involves linking the literature on the factors of failure (and success) of EMR and the literature on the causes of failure (or partial success). It proposes a synthesis of these factors in order to highlight the most important aspects to consider to promote appropriation, which goes beyond the implementation of the technology. Furthermore, we linked this synthesis to the literature on the professional bureaucracies, including the approach of Adler & Borys in favor of enabling formalization process. The design and effective implementation of technology focused on professional autonomy constitutes the most crucial point for appropriation and ERP benefits. We argued that only this approach would get out of a vicious circle that currently strengthen the bureaucratic logic to force appropriation, resulting in return professional resistance, and therefore not associated to ERM efficient uses. Thus, our theoretical contribution is completed by managerial recommendations, since we propose another approach to define, implement and enable the development of EMR.

In future research, we want to provide empirical examples to support our words, through case studies in French hospitals.

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