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IT vendors' legitimation strategies and market share: The case of EMR systems

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ABSTRACT

This study investigates the legitimation strategies adopted by information technology (IT) vendors and their respective influence on market share. We conducted an analysis of the public discourse on websites of top Electronic Medical Record (EMR) vendors in Ontario, Canada. A total of 815 segments extracted from these websites were analyzed. Our findings indicate that strategies under the cognitive and pragmatic forms of legitimacy were strongly represented in the EMR vendors' discourses compared with regulative and normative strategies. Furthermore, the link between legitimation strategies and market share has not yet been clearly established. Implications for practice and research are discussed.

1. Introduction

The information technology (IT) innovation field is concerned with understanding the factors that facilitate or inhibit the adoption, diffusion, and impact of emerging IT-based innovations [1,2]. Research on IT innovation has become increasingly popular as IT has continued its relentless march into almost every aspect of organizational life, and IT innovation has become a driver of organizational productivity and competitiveness [3]. Despite so much at stake, most of prior research in this area has been done within the *dominant paradigm,* which is "typified by the desire to explain innovation using economic-rationalistic models, whereby organizations with greater innovation-related needs and abilities – what is called the 'right stuff' – are expected to exhibit a greater quantity of innovation" ([4]: 315). Empirical studies following this paradigm have shown that large organizations that have greater technical expertise, possess supportive senior management, operate in more competitive contexts, and perceive innovation as more beneficial and compatible, are more likely to adopt a larger number of innovations, to adopt them earlier, and to implement them more thoroughly than their counterparts (e.g. [5,6],).

The dominant paradigm has yielded tremendous insights into the subject of how organizations can effectively evaluate innovations, manage the process of assimilating them, and ultimately benefit from them. However, while models consistent with this paradigm have accomplished high predictability, we concur with Fichman [4] that the dominant paradigm "may be reaching the point of diminishing returns" (p.315) in fully explaining the process of IT innovation in today's environment and providing additional opportunities for highly influential research. Indeed, prior research in this important area has brought us to a point where the broad elements of how managers can promote effective IT innovations, according to the dominant paradigm, are fairly well understood. Yet, we still face challenges in relation to IT innovation in organizations, which may necessitate novel approaches to better understand the process. Toward this end, Wang [7] argues that much remains to be explored on how organizations shape social cognition, which, in turn, shapes IT innovation adoption decisions. Put simply, organizations must understand the innovations they adopt and use. The *socio-cognitive perspective* of innovation research views other actors and organizations as important sources for that understanding.

According to this perspective, an innovation not only takes place in adopter organizations where it is materialized, but also exists in a collective environment where adopters, IT vendors, consultants investors, journalists, analysts, academics, and other institutional entrepreneurs are interested in developing the innovation as a *concept* [8]. Each IT innovation concept carries an organizing vision (OV). OVs correspond to collective understandings of organizational application of

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an IT innovation that are established, maintained, and transformed through community discourse [8]. An OV broadly addresses what the innovation is all about, why organizations should adopt and implement it, and how to do so. It performs three broad functions of legitimation, interpretation, and mobilization that together shape the diffusion of IT innovations among organizations [8].

The present study focuses on the OV function of legitimation. Legitimacy refers to "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" [9]. According to Kaganer et al. [10], legitimacy of an IT innovation may be investigated from two main perspectives. The first aims at understanding how an organization *adopting* a specific innovation seeks to gain legitimacy for that specific innovation. The ultimate goal of this perspective is for the "innovation adopter organization" to ensure internal adoption (and use) of the innovation. The second captures the perspective of the organization *offering* an IT innovation and investigates the process through which a vendor of a specific innovation works to provide legitimacy for the innovation. The ultimate goal is for the "innovation provider" to increase awareness and interest in the innovation, and hence increase the chances of potential adopters selecting this innovation. At the time that these two perspectives aim to build legitimacy of an IT innovation, the former uses a "pull" strategy with an adoption of innovation orientation, whereas the latter focuses on a "push" approach with a diffusion of innovation direction.

Although the first perspective has been considered in previous IS research in light of its strong link to IT acceptance and adoption (e.g., [11,12]), limited work has been done to explore and understand the second perspective, which relates to the IT innovation vendor. The present study addresses this gap by studying the process through which software providers work toward providing legitimacy for their IT products. Specifically, we focus on Electronic Medical Record (EMR) vendors given the relevance and importance of EMR systems in the context of primary care services, and their critical role as the foundation for health IT infrastructure. The importance of investigating the concept of legitimacy has been highly emphasized in previous research, both within and outside the IS field (e.g. [9,13–15],). Our survey of the extant literature reveals that the vast majority of prior studies in this area do not attend to the types of legitimacy that OVs seek to achieve or the general strategies that innovation entrepreneurs employ to build and manage different types of legitimacy. One exception is the study by Kaganer et al. [10], which develops and validates a taxonomy of legitimation strategies employed by the proponents of an IT innovation. More precisely, these authors examined the discursive actions of computerized physician order entry (CPOE) vendors based on the content analysis of 165 press releases. In this study, we build on this taxonomy and apply it to the public discourse associated with another core health IT innovation, namely, the EMR system. Hence, our study addresses the following research questions: (1) *To what extent does the IT legitimation taxonomy developed by* Kaganer et al. [10] *apply to EMR systems used in primary care settings? (2) Do core legitimation strategies vary across EMR vendors and between EMR and CPOE vendors? If so, how? and (3) Are legitimation strategies adopted by EMR vendors associated with their market share?*

Providing clear answers to these questions is essential, given the slow progress that has been observed in the past in the area of health IT adoption (ACTI, 2018), and the limited knowledge available on how various IT systems are perceived by health care providers who are faced with an abundance of technologies and systems to choose from. Furthermore, the above research questions are particularly relevant in a historically vendor-driven context in which various IT solutions are pushed on health care providers who, for the most part, have minimal technical knowledge and skills. In the following section, we present the OV theory developed by Swanson and Ramiller [8], and the conceptual framework for this research based on the taxonomy developed by Kaganer et al. [10]. In the remaining sections, we describe the adopted methodology and the results of the analyses we conducted on the legitimation strategies used by EMR vendors. Last, we discuss the implications of our findings for research and practice and then highlight the contributions and limitations of our work.

2. Theoretical background

The OV theory was conceived in 1997 by Swanson and Ramiller. It provides "a macro-level cognitive institutional perspective on how IT innovations are adopted, used, and diffused within and across organizations" ([16], p.1). According to this theory, the adoption, use, and diffusion of an IT innovation take place in the context of institutional processes that are noticeable in the development of a collective community idea or image of the innovation, which is called the "organizing vision" [8]. The OV being an idea, it needs a vehicle to exist and travel at the interorganizational level. OV theory says that this vehicle is the publicly available discourse about the application of the innovation in organizations [8]. This discourse is produced by a community consisting of all parties with an interest in the innovation, and community members who strive to legitimate the innovation through this discourse are called "institutional entrepreneurs" [17]. Adopters, IT vendors, consultants, and analysts are examples of institutional entrepreneurs in OVs' communities [8]. An OV informs about what the innovation is (know-what), why organizations should adopt and implement it (know-why), and how to do so successfully (know-how) [8,18]. As mentioned earlier, it performs three key functions that together shape diffusion of IT innovations among organizations: 1) legitimation of the innovation by deploying supporting justification, 2) interpretation of the innovation to reduce uncertainty, and 3) mobilization of forces that emerge to support the material realization of the IT innovation [8].

While the OV theory "offers a sound conceptual foundation and rich analytical context for furthering research into IT innovation diffusion" (p. 2), several aspects of the theory warrant further elaboration [10,16]. Although we know that IT vendors are major contributors to OVs (e.g. [17–19],), there is a need to better understand the role that IT vendors play in relation to the three functions of OVs [16]. In line with our own objective, Kaganer et al. [10] argue that we need to deepen and broaden our understanding of the strategies that IT vendors employ to enhance the legitimacy of their innovations. Their taxonomy of legitimation strategies comprises four salient forms of legitimacy, which we will summarize in the following paragraphs.

First, *cognitive legitimacy* refers to legitimacy based on the spread of knowledge about the innovation in constitutive audiences and on the ambiguity or comprehensibility of the innovation's key properties and applications [8,20,21]. Comprehensibility is influenced by the availability of coherent and plausible accounts explaining the existence of an innovation and relies on sensemaking that can be undertaken by strategic means [9,10]. Kaganer et al. [10] explain that "[a]s the knowledge spreads, comprehensibility of an innovation increases, and so does its cognitive legitimacy" (p.14). This type of legitimacy "arises when there is a broad awareness about [an innovation] among the relevant audiences [20] and the [innovation] is perceived as coherent and meaningful [9,22]" ([10], p.7).

Second, *pragmatic legitimacy* refers to stakeholders' support of an innovation because of its expected value to them, or the fact that the innovation entrepreneurs have coopted them or other influential actors, or as they consider the actors promoting the innovation as generally trustworthy, reliable, and honest [9]. This form of legitimacy rests on the self-interest of an innovation's audiences and involves the evaluation of the innovation's utility for such audiences [9,22]. Ramiller and Swanson [23] identify "business benefit," which encompasses judgments of audiences about the value that an innovation is likely to deliver if adopted by an organization, as critical for pragmatic legitimacy.

Third, *normative legitimacy* refers to legitimacy based on the benevolent logic of advocating social justice and welfare [9]. Normative legitimacy can also be called "moral" legitimacy as it is opposed to

Table 1
Examples of legitimation strategies used by CPOE vendors (from [10]).

Cognitive legitimacy	*Pragmatic legitimacy*
• Expressing the capabilities of an innovation	• Explaining and illustrating how innovation improves the quality of care in an adopter organization
• Describing how characteristics of the innovation are in alignment with current technological best practices	• Emphasizing the innovation vendor's strong reputation in the innovation domain
Regulative legitimacy	*Normative legitimacy*
• Stressing compliance with legal and quasi-legal rules and regulations	• Stressing congruence of the innovation with prevailing moral norms
	• Stressing the enabling role of innovation

strategic self-interested manipulations [9]. It is based on judgments about whether an innovation is aligned with, or promotes, moral values and norms prevailing in a particular audience [10]. This form of legitimacy involves considerations of whether adopting a given innovation is socially "the right thing to do" [9]. Last, *regulative legitimacy* refers to legitimacy based on the mandated use of innovation by a formal authority or on the innovation capacity to enhance organizations' compliance with rules and regulations that are formally prescribed within the field [10]. Support for innovations that help achieve such compliance is usually granted to reduce pressures imposed on organizations by regulative institutions [24].

These four distinct forms of legitimacy are conceptualized at a high level of abstraction and, therefore, can accommodate a wide range of IT innovations. Legitimation strategies, on the other hand, encompass the ground-level efforts of practice entrepreneurs and need, therefore, to reflect the particulars of the legitimation domain (see Table 1). In the particular case of CPOE systems, for instance, Kaganer et al. [10] found that vendors employed 26 distinct strategies from their taxonomy to varying degrees to construct their discourse. However, strategies aimed at pragmatic and cognitive forms of legitimacy were most strongly represented in the CPOE vendor discourse. In particular, the strategies that were present in more than 60 % of press releases are the ones that explain how that particular innovation improves the quality of medical care, describes positive market response to the innovation and emphasizes its ongoing development, and explicitly defines key features, attributes, and usage conditions of the innovation. Nevertheless, despite this important contribution to the IT innovation research, it is unclear at this point whether the strategies proposed by Kaganer et al. [10] represent the core legitimation tasks for any health IT innovation or whether they are particular to the CPOE context. The full taxonomy developed by Kaganer et al. [10] is presented in Appendix A.

As shown in Table 2, prior IS research on legitimation strategies is still limited. We searched the Web of science and ABI/Inform databases using legitimacy and legitimation as our main keywords. To ensure comprehensiveness, we also examined the references cited in Kaganer et al. [10]. In all, we identified eight empirical IS studies that investigated legitimation strategies and their effects. We observed that these studies mainly focused on the decisions made by project managers and other stakeholders to gain, maintain or repair IT project legitimacy throughout a project lifecycle. For its part, a single study focused on IT service providers' actions to legitimate their service offering. As for our own contribution, it is best situated in the third subgroup of studies which aims to identify the legitimation strategies that are leveraged by different institutional actors (i.e., software vendors, adopters, consultants, analysts, etc.) to ensure or sustain an innovation's widespread adoption and diffusion in the industry. To our knowledge, our study is the first to investigate this important question in the digital health context.

3. Methodology

To assess the applicability of Kaganer et al.'s taxonomy to another core health IT innovation, we propose to analyze the public discourse of EMR providers in Canada. These systems are designed to support the tasks and activities of family physicians and other authorized professionals in primary care medical practices as opposed to the CPOE systems that are used by physicians working in hospital settings (Buntin, 2010; Chang, 2015). The main functionalities associated with an EMR system include, among others, medical consultation notes, lists of problems, allergies, vaccinations, vital signs, new prescriptions and renewals, automated alerts, automated reminders, and medical appointments. As health authorities around the world continue to press for more efficiency and effectiveness in primary care settings, EMR systems are increasingly required [30,31]. At present, there is significant variation in the state of EMRs and their adoption across Canada, with provinces like Ontario using a "laissez-faire" unregulated market approach providing freedom to health care providers to choose their respective systems [32]. This province is of particular interest here in light of the active role of vendors in potentially shaping the adoption and diffusion of EMRs.

Following Kaganer et al. [10], we adopted a content analysis approach whereby we created quantitative statements or inferences based on the identification, frequency, and emphasis given to a specific content. Stemler [33] defines this method as "a systematic, replicable technique for compressing many words of text into fewer content categories based on explicit rules of coding." In the IS discipline, content analysis has gained significant popularity as a technique for uncovering relevant content areas, which present a "bridge" between qualitative data and quantitative analysis [34–36].

As a first step, it was essential to identify the vendors to be included in the study. To that end, we consulted the Ontario MD and the Canadian EMR websites and extracted the EMR vendors that appear on both lists. These websites were selected mainly because they are recognized as reliable and trustworthy sources in Canada. Ontario MD is a subsidiary of the Ontario Medical Association, which is funded by the Ontario Ministry of Health and Long-Term Care. It supports physician practices in the selection, implementation, and adoption of EMRs and other digital health tools. For its part, Canadian EMR is an authoritative and widely recognized national resource for physicians, medical office staff, health care planners, government organizations, and vendors of EMR systems. Based on the market share of each vendor, we decided to consider the top five vendors for inclusion in the present study. These EMR vendors, Telus Health Solutions (TELUS), OSCAR, QHR Technologies, Nightingale Informatix Corp., and P&P Data Systems Inc., share 91 % of the EMR market in Ontario. Table 3 shows a great disparity in terms of the market share of these vendors as of January 1, 2017.

Once EMR vendors were identified, we conducted an in-depth analysis of the information presented on their respective websites, and extracted the information related to the vendors' legitimacy discourses. As mentioned earlier, the taxonomy developed by Kaganer et al. [10] served as a theoretical foundation for the development of our coding scheme. Using this scheme, one member of the research team extracted and coded all relevant segments from the vendors' websites. Our unit of analysis takes the form of either a single phrase or a passage containing multiple phrases. To locate legitimacy segments on the EMR vendors' websites, we focused on meaningful explicit statements, which included clear aspects of legitimation such as "Our EMR displays patient information and specific trends with one-step graphing and flow sheets" (cognitive), "You will save valuable time thanks to advanced features

Table 2
Prior IS research on legitimation strategies.

Reference	Study focus			Research method	Key findings
	IT project legitimacy	IT providers' legitimacy	Innovation legitimacy		
Hjelholt and Jensen [25]	How IT projects navigate in discourses over time to legitimize their actions and ambitions and ensure project success			A case study of an IT project in a Danish local government	The management of IT projects needs to be constituted within historical, national and local discourses. Strategic action is deemed legitimate if it conforms to organizational norms, policies and structures
Dennis et al. [26]	How the structures of legitimation enable and constrain loyal use of an enterprise system in an organization			Mixed-methods case research approach in a multinational pharmaceutical firm	Social norms encourage acceptable behavior while social sanctions constrain unacceptable behavior. Structures of legitimation explain loyal use for novice users
Meissonier et al. [15]	How project leaders manage ERP project legitimacy with key stakeholders to ensure success			Multiple case study in two organizations	ERP organizational adoption decisions are associated to pragmatic, moral and legitimation actions
Flynn and Du [11]	How the legitimation process undertaken to gain stakeholder support for the development of an information system unfolds			Single case study	The legitimation-seeking process comprises three generic phases: gaining, maintaining and repairing. Different legitimation strategies and activities take place within each phase
Hsu et al. [12]	What legitimacy challenges arise in implementing a successful cross-cultural interorganizational information system (IOS) in a global context			Single case study	The implementation of an IOS is a dynamic process involving the recognition, understanding, and management of the regulative, normative, and cognitive challenges arising in two different institutional settings
Marsan et al. [27]		How free/open source software service (FOSS) providers use entrepreneurial action to legitimate their service offering		Multiple case study	Existence of entrepreneurial actions used for legitimation purposes that are unique to the FOSS services context: product-based theorization and evangelization
Wang and Swanson [28]			What legitimation strategies institutional actors use to sustain a new IT's early momentum toward widespread adoption	Analysis of archival data related to CRM systems	Sustaining technological (CRM) momentum is an important institution-building task. Actors must produce and disseminate credible discourse advancing CRM, accentuating its progress and keeping it worthy of continued attention
Lynn et al. [29]			What legitimation strategies are leveraged by institutional actors in the Blockchain ecosystem	Analysis of public discourse of key actors' Twitter accounts	Actors employ three primary micro-level legitimation strategies through two types of legitimation mechanisms (pragmatic and cognitive legitimacy)
This study			What legitimation strategies EMR vendors adopt and their influence on market share	Analysis of public discourse on top EMR vendors' websites	Strategies under the cognitive and pragmatic forms of legitimacy were strongly represented. The link between legitimacy strategies and market share is not clearly established

Table 3
Top EMR vendors and market share as of January 1, 2017 (source: OntarioMD).

Rank	EMR vendor	EMR product	Market share
1	TELUS Health Solutions	PS Suite	35 %
2	OSCAR	OSCAR EMR	19 %
3	QHR Technologies	Accura EMR	19 %
4	Nightingale Informatix	Nightingale on Demand	13 %
5	P&P Data Systems	P&P CIS	5%

Table 4
Inter-rater agreement rates.

Form of legitimacy	# of codes in coding scheme	Total # of coded segments	Total # of agreements	% of agreements
Cognitive	8	592	518	87.5%
Pragmatic	15	192	145	75.5%
Normative	2	11	9	81.8%
Regulative	1	20	19	95.0%
Total	**26**	**815**	**691**	**84.8%**

such as prescription management, referral management, customizable search options, and Group Care" (pragmatic), and "v4.0 is certified for Ontario Laboratories Information System and for Hospital Report Manager" (regulative). All in all, 815 segments were extracted and coded by one member of our team.

The reliability of the coding scheme was tested by having the other team members independently code the extracted segments. Each member was assigned those segments associated with a particular form of legitimacy. As shown in Table 4, this process resulted in an overall agreement rate of 85 %. The differences were reconciled by consensus during face-to-face team meetings. Differences were highest for segments related to pragmatic legitimacy. Two reasons may explain this. First, the number of codes associated with this particular form of legitimacy (i.e., 15 out of 26) is much higher than the other three categories, making the coding process more challenging. Second, it was not always obvious to dissociate between segments, which aimed to explain how the EMR system improved clinical, financial, operational, business, or IT value ("rationale") and those which aimed to provide specific examples of such value ("success story").

4. Results

4.1. Application of IT legitimation taxonomy to EMR systems

EMR vendors in Ontario used all four forms of legitimation strategies to build their discourse, contributing to the external validity of Kaganer et al.'s (2010) taxonomy. As indicated in Table 5, strategies under the cognitive (73 %) and pragmatic (24 %) forms of legitimacy were most strongly represented in the vendors' discourse compared with regulative (2%) and normative (1%) strategies. This result is similar to Kaganer et al. [10] where strategies aimed at pragmatic and cognitive forms of legitimacy were represented most strongly in the CPOE vendors' discourse. It is also worth noting that while CPOE vendors used 26 strategies to form their discourses [10], EMR vendors employed a total of 20 strategies to construct theirs, of which 19 come from the original taxonomy and one was inductively derived from our data.

Table 5
Extracted segments per forms of legitimacy.

Form of legitimacy	Number of extracted segments	% of extracted segments
Cognitive	592	73 %
Pragmatic	192	24 %
Normative	11	1%
Regulative	20	2%
Total	**815**	**100%**

4.2. Top legitimation strategies for EMR systems

The legitimation strategies most frequently adopted (more than 10 statements) by EMR vendors are shown in Table 6. Our results demonstrate a clear emphasis on the EMR system characteristics and functionalities representing cognitive legitimacy; three of the top five strategies belonging to this particular form. The most commonly used strategy, **C3 System – characteristics**, consists of statements depicting how well the EMR system performs its functions. C3 manifestations in our sample include claims concerning an EMR system's performance with regard to interoperability, scalability, reliability/response time, security/privacy, and usability. Many statements also contained descriptors emphasizing that the innovation is on the cutting edge of technology or clinical progress. These themes are important and relevant in light of the national agenda for developing electronic health records (i.e., comprehensive view of a patient's interaction with the health system across providers) for Canadians (Canada Health Infoway, 2019).

The other two cognitive strategies included in Table 6 are C1 and C2. The **C1 System – functionality** strategy comprises statements centered on defining key attributes, features, or usage conditions of the EMR system. More specifically, the C1 discourse in our study includes laundry lists of features, EMR suite descriptions as well as more detailed accounts of how a particular EMR functionality operates. In sum, the C1 strategy seeks to enhance the comprehensibility of an IT innovation by describing what the innovation can do. For its part, the **C2 System – configuration** strategy seeks to delineate the configuration of IT through which the EMR functionalities or capabilities are delivered (i.e., how the EMR system can do what it does). It is important for certain stakeholder groups such as IT staff to know the characteristics of the underlying IT artifact. Fig. 1 shows the central importance of C1, C2, and C3 strategies in the cognitive form of legitimacy.

P5 Value – operational – rationale, which is the most prominent pragmatic strategy in the top list for EMRs, explains how innovation improves operational performance of an adopter organization. Key statements associated with this strategy encompass considerations of efficiency, productivity, and workflow. Hence, EMR systems were portrayed by vendors as promising significant improvements because of their ability to automate clinical tasks, improve collaboration inside the medical practice as well as across the continuum of care, and provide easy real-time access to required clinical information. **P14 - Reputation – vendor** is another pragmatic strategy widely used by EMR vendors. It encompasses statements emphasizing firm characteristics that reflect favorably on the vendor's reputation. For EMR vendors, these characteristics included leadership in a certain application area (e.g., "Largest single EMR platform in Canada and market leader for specialists"), prior performance record of accomplishment (e.g., "With thousands of successful client engagements under our belts") as well as awards and other signs of formal recognition of accomplishments (e.g., "[Name of EMR vendor] was selected as a top 50 company on the 2014 TSX Venture 50″). **P1 - Value – clinical – rationale** and **P3 – Value – financial – rationale** are the other two pragmatic strategies in the top list. P1 aims to establish the value of an innovation in its immediate application domain, in our EMR case – that of primary care clinical services. EMR systems are mainly purported by vendors to improve primary care in terms of patient safety, quality of care, and error prevention. For its part, P3 explains how innovation improves financial performance of an adopter organization. EMR vendors have emphasized statements of cost-effectiveness, financial well-being, and financial savings in their discourses to legitimize their EMR products. Fig. 2 shows the proportion of codes per strategies aimed at pragmatic legitimacy.

Table 6
Top legitimation strategies used by EMR vendors.

Legitimation strategies (code and name)		Short description	Number of statements
C3	System – characteristics	Describes characteristics of the innovation that are in alignment with current technological best practices	249
C1	System – functionality	Defines key features, attributes, and usage conditions of the innovation	213
P5	Value – operational – rationale	Explains how the innovation improves operational performance of an adopter organization	92
C2	System – configuration	Defines key characteristics of the underlying IT artifact	95
R1	Regulative – compliance	Stresses compliance with legal and quasi-legal rules and regulations	20
P14	Reputation – vendor	Emphasizes firm characteristics that reflect favorably on the vendor's reputation.	29
P1	Value – clinical – rationale	Aims to establish the clinical value of an IT innovation	21
P3	Value – financial – rationale	Aims to establish the financial value of an IT innovation	21

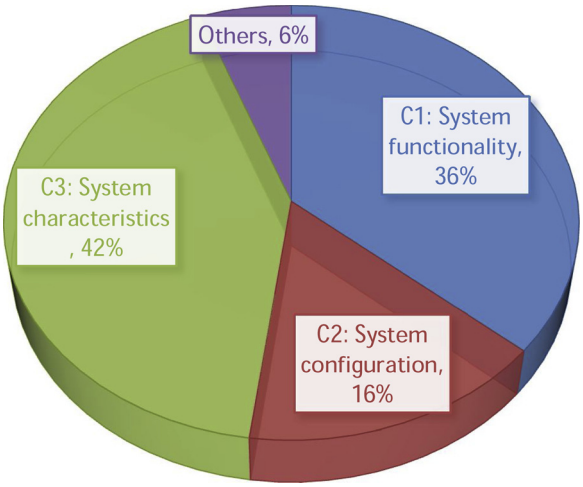

Fig. 1. Proportion of codes per strategies aimed at cognitive legitimacy.

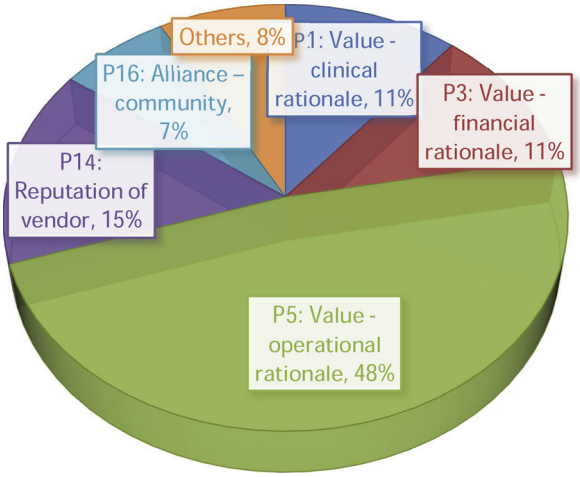

Fig. 2. Proportion of codes per strategies aimed at pragmatic legitimacy.

The only legitimacy strategy under the regulative and normative forms in the top list is **R1 Regulative – compliance**. EMR vendors try to convince family physicians and managers that their products can help their medical practice become compliant with rules and regulations that the field formally enforce. To this end, vendors in our sample produced justifications of the role of EMR systems in achieving compliance with industry-wide regulations such as the Health Insurance Portability and Accountability Act (HIPAA) and the Joint Commission on Accreditation of Healthcare Organizations (JACHO) as well as in conforming to rules that the provincial and federal agencies have established.

Table 7
Comparison of EMR and CPOE vendors' legitimation strategies.

Forms of legitimacy	Strategies	Rankings (EMR vendors)	Rankings (CPOE vendors)
Cognitive	C1	#2	#3
	C2	#4	#4
	C3	#1	#6
	C4	#11	#12
	C5	#15	#14
	C6	–	#23
	C7	#12	#2
	C8	#13	#13
Pragmatic	P1	#7	#1
	P2	–	#18
	P3	#8	#10
	P4	–	#24
	P5	#3	#7
	P6	#16	#20
	P7	#17	#21
	P8	–	#25
	P9	–	#17
	P10	#19	#26
	P11	#18	#11
	P12	–	#22
	P13	#20	#9
	P14	#6	#5
	P15	–	#8
	P16	#9	–
Normative	N1	#10	#16
	N2	#14	#19
Regulative	R1	#5	#15

4.3. Comparison of legitimation strategies used by EMR and CPOE vendors

Table 7 compares the use of legitimation strategies by EMR vendors (this study) and CPOE vendors (in [10]). A first observation is that, although rankings between the two groups of vendors vary slightly, they are relatively consistent. For one thing, the most widely used legitimacy strategies are relatively the same with 7 of the top 10 strategies for EMR vendors being also in the top 10 list of CPOE vendors. Both sets of vendors often referred to strategies about **System – functionality (C1)**, **– configuration (C2)** and **– characteristics (C3)** to build their repertoires. The two groups are also similar in their reliance on **P14 Reputation – vendor**. Even though **P5 Value – operational – rationale** is more widely used by EMR providers than CPOE vendors, it appears as an important pragmatic strategy for both sets of actors. A similar pattern is also found for **P3 Value – financial – rationale**. Furthermore, the 10 least used strategies by CPOE vendors are either in the bottom list of EMR vendors or are not used by the latter group at all. Interestingly, seven legitimation strategies found in Kaganer et al.'s (2010) taxonomy were not employed by EMR vendors, six of which are associated with the pragmatic form of legitimacy and one is a cognitive strategy:

- **C6 Implementation–challenges**: Discuss challenges and/or risks associated with innovation;

- **P2 Value–clinical–success story**: Provide examples of how innovation improves the quality of medical care in an adopter organization;
- **P4 Value–financial–success story**: Provide examples of how innovation improves financial performance of an adopter organization;
- **P8 Value–business–success story**: Provide examples of how innovation improves general business performance of an adopter organization;
- **P9 Value–IT–rationale**: Explain how innovation improves management of IT in an adopter organization;
- **P12 Alliance–vendor**: Advertise partnerships and/or collaborations with other innovations entrepreneurs (e.g., vendors and consultants);
- **P15 Reputation–adopter**: Describe favorable characteristics and/or stress reputation of the adopter organization.

The non-use by EMR vendors of 40 % (6 out of 15) of strategies aimed at pragmatic legitimacy is worth noting. This is particularly relevant in light of a recent study that showed that stakeholders' view of the proposition of EMRs remains unanswered [37]. It is also interesting to note that none of the EMR vendors mentioned in their discourse the challenges or risks associated with EMR implementation and long-term sustainability, which often represent preoccupations for health care providers. Furthermore, all the strategies related to **success stories** be it **clinical (P2)**, **financial (P4)**, or **business (P8)** were absent in the case of EMR vendors, except for **P6 Value – operational – success story**. This observation is echoed by a reported gap in the extant literature in relation to impacts and financial benefits of EMR systems in primary care settings [37].

The new strategy that emerged in this study is **P16 Alliance – community**. It aims to "advertise collaborations under the open source community maintaining the innovation." While it appears in the data extracted from a single EMR vendor, it occupies a fair 7% of the pragmatic legitimation discourse and the 9th place overall (see Table 7). OSCAR is the only vendor offering an open source EMR, which is described as:

> "*[A system] built by, maintained by and responsive to a community that includes academic and research institutions, diverse community practices (NP, Chiropractic, Physiotherapy, Midwife Services, etc.), hospitals, ambulatory and outreach programs, public health departments, and other social service agencies [… and that] is continuously enriched by contributions from OSCAR users and the Charter OSCAR Service Providers that support them." (Source: OSCAR web site)*

In sum, our results demonstrate that EMR vendors emphasized the operational value and technological details of their IT solutions and set aside many of the value-related strategies to gain legitimacy. For their part, CPOE vendors preferred to put forward the clinical value of the system and the positive market response to it, which would support a more convincing approach to a relatively complex innovation, but without excluding the technological details of the system. This represents a major variation between the core legitimation strategies across the two different health IT innovations. Appendix B provides a detailed analysis of the legitimation strategies found in EMR and CPOE vendors' discourses.

4.4. Legitimation strategies and market share of EMR vendors

The proportion of coded segments per EMR vendor is shown in Fig. 3. The top two market leaders, TELUS and OSCAR, occupy only 16 % of the legitimation discourse each. The third market leader QHR, however, is undoubtedly the most active vendor in terms of legitimation efforts occupying 33 % of the legitimation discourse. Nightingale, the penultimate vendor in terms of market share, occupies 10 % of the legitimation discourse, which is less than half of the last vendor P&P (24 %). Altogether, QHR, P&P, and Nightingale fill 67 % of the legitimation discourse. Therefore, the overall use of legitimation strategies by EMR vendors does not seem to be linked to their market share. The following paragraphs provide a more detailed analysis.

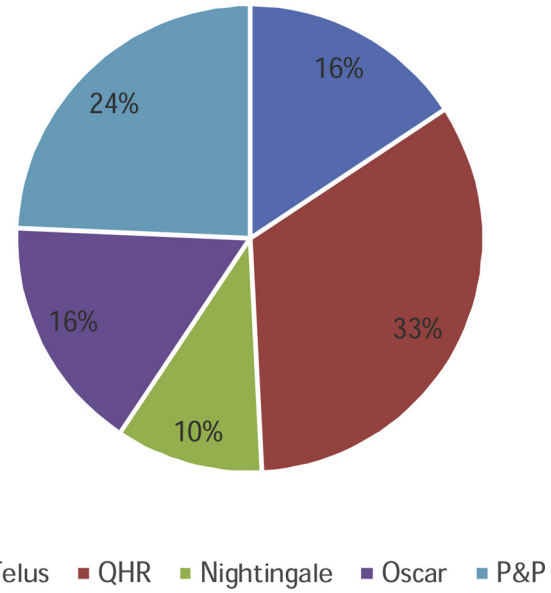

Fig. 3. Total number and proportion of codes per EMR vendor.

The proportion of codes (i.e., quotes coded from the EMR vendors' discourse) per EMR vendor for each type of legitimation strategies is shown in Fig. 4. QHR, the third market leader, had the biggest portion (30 %) of its discourse aimed at cognitive legitimacy (i.e., presenting knowledge about the EMR system capabilities and alignment with best practices), followed by P&P (27 %), the vendor with the least market share. TELUS and OSCAR, the leaders in the vanguard, contribute only 16 % and 17 % of the discourse, respectively, which may reflect the established nature of their EMR and its familiarity in the market. Nightingale occupies 10 % of the discourse aimed at cognitive legitimacy, which is slightly more than a third of P&P, the least prolific vendor in the market. As such, the three least popular vendors together contribute to 67 % of the discourse on cognitive legitimacy, which is not in line with their respective market shares. Therefore, the use of strategies aimed at cognitive legitimacy does not seem to be associated with a larger market share, and our findings indicate that the more EMR vendors use the **C2 System – configuration** strategy, which explicitly defines key characteristics of the underlying IT artifact, the less their market share.

The use of strategies aimed at pragmatic legitimacy (i.e., explaining the value of the EMR system and emphasizing the vendor's strong reputation) followed a similar pattern as strategies aimed at cognitive legitimacy, with 75 % of the related discourse originating from the three least popular vendors, although their portion of the discourse did not reflect their respective market share. As in the case of cognitive legitimacy, QHR that ranks third in market share is undoubtedly the most active vendor in efforts aimed at pragmatic legitimacy, contributing 46 % of this discourse. The two leaders in the market, TELUS and OSCAR, used a relatively low percent of discourse focusing on pragmatic legitimacy compared to other vendors. Therefore, as is the case with cognitive legitimacy, the use of strategies aimed at pragmatic legitimacy by a vendor does not seem to be linked to the market share of that vendor.

Interestingly, the two market leaders together represent 65 % of the discourse aimed at regulative legitimacy (i.e., highlighting the capacity of the EMR system to facilitate compliance with rules and regulations), which was found to be among the least used in terms of legitimation strategies in the top five presented above. QHR, the third market leader,

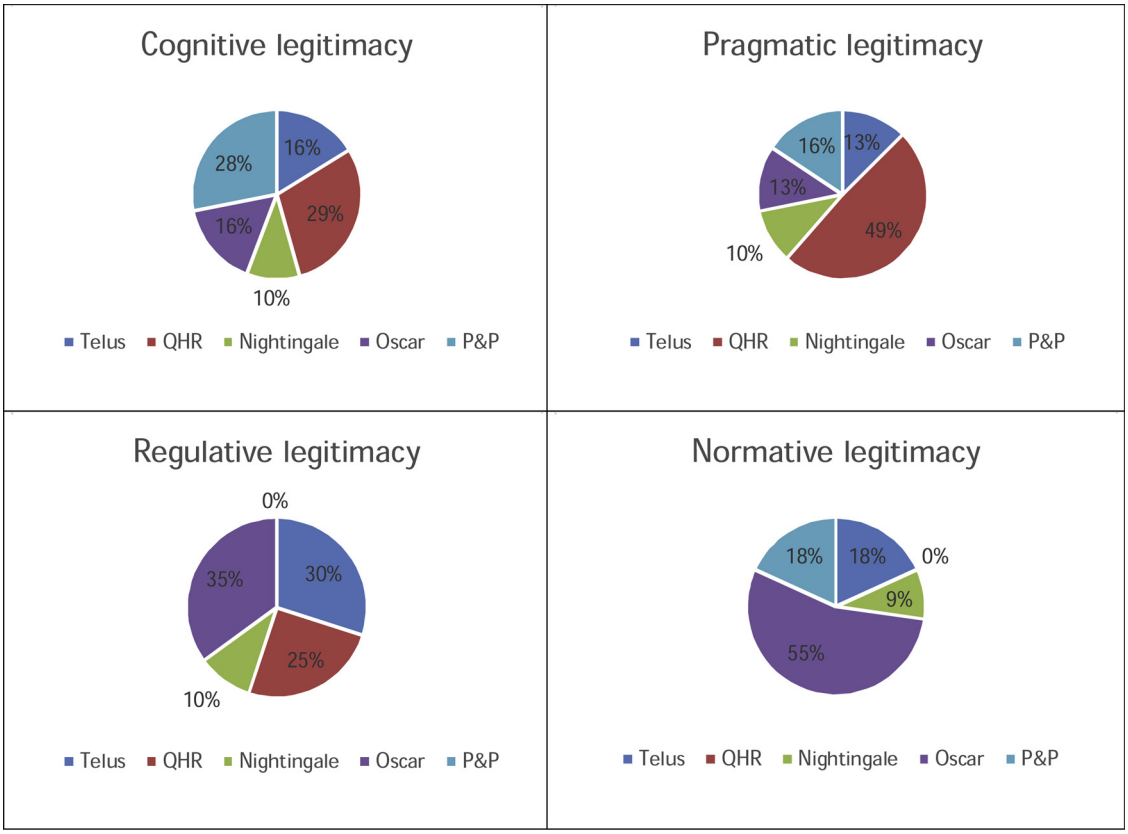

Fig. 4. Proportion of codes per EMR vendor per types of legitimation strategies.

also follows the same pattern with 25 % of its discourse aimed at regulative legitimacy. P&P, the fifth vendor in terms of market share, does not employ any strategies aimed at regulative legitimacy, which is surprising in a critical environment as health care with particular patient safety, privacy, and practice requirements and regulations. In this case of regulative legitimacy, the proportions of discourse and the market shares are closely aligned, except for the two EMR vendors, whereas OSCAR puts more efforts (5% more) in the regulative discourse than TELUS, the market leader.

Last, regarding the use of strategies aimed at normative legitimacy (i.e., stressing the congruence of the EMR system with norms and values), the link between market share and portions of the discourse is not clear. The top two vendors demonstrate a divergent strategy with TELUS accounting for 18 % of the normative legitimacy discourse as opposed to OSCAR (55 %), the most active vendor using strategies aimed at normative legitimacy. The least popular vendor, P&P, represented a fair proportion of the discourse (18 %), which is equivalent to the proportion contributed by TELUS, the market leader. Surprisingly, QHR, the third most popular vendor, does not employ any strategy aimed at normative legitimacy.

5. Discussion

The results of this study show that the four distinct forms of legitimacy proposed by Kaganer et al. [10] are conceptualized at a level of abstraction high enough to accommodate other core health IT innovations such as EMR systems. Legitimation strategies encompass the ground-level efforts of vendors and, therefore, reflect particulars of the legitimation domain. In the case of CPOE systems, Kaganer et al. [10] found that vendors employed 26 strategies from the IT legitimation taxonomy to varying degrees to construct their discourse. Our results show that EMR vendors in Ontario employed 20 strategies to construct their discourses: 19 out of the 26 original strategies proposed by Kaganer et al. [10] with one new strategy that has emerged from our data.

Our findings also demonstrate that EMR vendors prefer to emphasize the operational value and technological details of their system, and to set aside many of the value-related strategies (e.g., clinical value) to gain legitimacy. This may have contributed to the historical slow diffusion of health IT innovations (ACTI [38]), which is further accentuated by health care providers' limited technical knowledge. Research has demonstrated that adopters of EMR systems often use only a fraction of the capabilities and functions these systems offer [32]. The question is then whether these strategies are actually being effective in terms of leveraging the actual benefits of this IT innovation. For their part, CPOE vendors put forward the clinical value of the system and the positive market response to it, but without excluding the technological details about the system. Of particular interest is the focus on how the system improves the quality of care in an adopter organization, which ranked first among CPOE strategies versus seventh for EMRs. As mentioned earlier, this represents a major variation between the core legitimation strategies across the two health IT innovations. Although this may be explained by the fact that CPOE systems are known to be radical and complex innovations that stir much more resistance from physicians than do traditional EMR systems, this may have equally contributed to the slow diffusion of the latter in health care settings.

While pragmatic legitimacy refers to the notion of desirability, cognitive legitimacy is often associated with validity [10]. Johnson et al. [39] point out that "legitimacy has both a cognitive dimension that constitutes the object for actors as a valid, objective social feature and a normative, prescriptive dimension that represents the social object as right" (p. 57). Kaganer et al. [10] assert that legitimacy may rest on the development of a shared understanding of the innovation as a valid social feature or, put simply, as something that can exist in the target audience's context. They refer to this as legitimation based on *validity*. They argue that members of the target audience may evaluate

an innovation with regard to its benefit to cultural aims most important to them. Kaganer et al. [10] refer to this as legitimation based on "rightness" or *desirability*. EMR vendors, in their legitimation efforts, put more emphasis on EMRs being a "valid" innovation in the health care context than on EMR adoption being "the right thing" to do for physicians. This does not align with more than a decade of quality improvement efforts and research in the area of health IT (e.g., [31,40–42]), which called for health IT solutions in general, and EMRs in particular, as necessary tools to support access to timely patient information and delivery of care.

In addition, one cannot but speculate whether the major EMR vendors on the Ontario market have actually considered the importance of designing these systems to actually support quality of care and make them more attractive to family physicians. This is especially relevant in light of recent studies that have demonstrated that the anticipated benefits of EMRs have not been fully reaped, and few physicians perceive that EMR systems have indeed improved their decision-making and patients' health outcomes [31,42–44]. Interestingly, EMR as well as CPOE vendors did not use more than half of all pragmatic legitimacy strategies found in [10] taxonomy, an area of great importance to highlight and address. There have been discussions on the necessity of providing incentives and encouraging IT vendors to communicate with involved stakeholders, including government and health care providers, and share information (ACTI [38]). Highlighting the value associated with EMRs for physicians' practice, especially with the expected enhanced analytical capabilities powered by artificial intelligence, would contribute to a better positioning of these systems in the context of medical practices and facilitate their diffusion in these settings.

The pragmatic strategy (desirability) that EMR vendors used most often consists of explaining how innovation improves operational performance. This finding is in line with Trudel et al. [44] who observed that what medical clinics in Canada look for when investing in an EMR system is essentially improved operational efficiency, not improved quality of care. For its part, the most often used cognitive strategy (validity) consists of describing the various functionalities and technological characteristics of the innovation. This result is also in line with Trudel et al. [44] who observed that EMR vendors mainly transfer knowledge about what EMRs are (i.e., know-what) to their clients. They also tend to transfer little or no information about the reasons for adopting an EMR system (i.e., know-why) and the strategies for successfully implementing and assimilating an EMR system (i.e., know-how). This echoes recent research that identified knowledge gaps on ascertaining the value of EMR in primary care and understanding elements of EMR implementation and adoption [37], which may have been an underlying reason for the slow diffusion of these systems.

In this line of thought, it is interesting to note that our results and those of Kaganer et al. [10] suggest that EMR and CPOE vendors do not refer much in their respective discourse to the potential implementation challenges or risks associated with their innovation (C6). It seems that they leave the "implementability" issue out as a sole responsibility of the adopting organization, which may be intimidating for physicians when considering this endeavor. Paré et al. [30] reported that knowledge barriers related to the selection and deployment of EMR systems were among the top five reported barriers by physicians, and it seems that the vendors have so far counted on regulations to push their products on health care providers, rather than building a partnership with the health care providers to guide them through the EMR innovation implementation journey. With the anticipated growth of analytics capabilities that can be leveraged with EMRs, we call for a paradigm shift that fosters formal partnerships and collaborations between vendors and health care providers to better reap the benefits of these technologies.

Our findings also indicate that the link between legitimation strategies and market share is not clearly established, except for two elements. First, efforts put in the regulative discourse seem to pay. In our sample, the more a vendor emphasized compliance of its EMR system with industry-wide regulations and rules established by provincial and federal agencies, the higher its market share. This brings to question whether regulatory changes are necessary to better integrate requirements, beyond technical dimensions, tied to establishing the value of these systems. Second, legitimacy efforts put in defining the technical configuration of EMR systems are negatively associated with market share. This might be explained by the limited ability of family physicians, who make EMR adoption decisions in medical clinics, to actually interpret and make sense of these technical details. For one thing, family doctors are members of a professional order and of professional associations that regulate their daily practice [45,46]. As such, they know the importance of complying with established rules and regulations, which may be the reason why leading vendors tend to emphasize regulative legitimacy strategies to get the buy-in to their EMR systems. In addition, prior marketing research reveals that when exposed to ads using heavy technical jargon, consumers with no or very low technical knowledge tend to rate the advertised products as being difficult to use (e.g. [47],). In the present context, it is possible that the more technical the EMR vendor's discourse is, the higher its EMR system is perceived by potential adopters (i.e., physicians with no or low technical background) as complex and difficult to use. Hence, top vendors tend to steer away from this strategy to optimize the receptiveness of physicians to their system. This proposition deserves attention in future research and leads to speculation on the potential competitive advantage that new EMR vendors may have if they proceed with different legitimation strategies that resonate more with physicians.

As mentioned earlier, the new legitimacy strategy that emerged from our data (i.e., P16 Alliance - community) aims to advertise collaborations under the open source community maintaining the EMR innovation. Our results thus suggest extending the original taxonomy to include the newly found strategy for legitimating open source systems. In addition to P16, two existing strategies must also be adapted or enhanced to consider the open source context. First, strategy C5 (Implementation – success story) shall include "participation to the community by sharing the local enhancements to the system source code with this community" as another component. Second, strategy N1 (Normative – moral) must include the well-being of populations and enhancement of work experience through open, transparent, and community-based collaboration for the development and growth of IT innovation. In support of these propositions, Marsan et al. (forthcoming) posit that strategies employed by IT vendors to legitimate their professional services for open source software adopters (training, integration, technical support, user support, etc.) are shaped by the open nature of the software associated with their services and by the openness values at the core of the open source movement. Beyond and above the system development approach (open source vs. proprietary) and its underlying values, other contextual factors might also influence the choice and shape of legitimation strategies adopted by IT vendors. Among such factors we can think of the degree of complexity and "disruptiveness" of the IT innovation itself, the profile of the targeted users (in terms of computer literacy or experience, openness to change, etc.), the imperativeness of digital transformation as well as the degree of reinforcement of regulations in the targeted industry. These and other contextual factors need to be investigated in future research.

Another avenue for future research consists of investigating the role of artificial intelligence (AI) as a component of EMR systems and the change in vendors' strategies accordingly. While the EMR systems from the five vendors considered in this study did not implement AI, globally EMR systems are beginning to incorporate AI capabilities [48,49]. This calls for a further investigation of how various vendors will adapt to their strategies in light of these changes, which may have implications on vendors' market shares and primary care practices alike. AI represents a preeminent technology trend and key innovation driver across industries including health care[1] . It is powered by such techniques as machine learning (ML) or natural language processing, which involves computer learning from example data and forming complex

decision rules, which could be applied rapidly and at scale (for further discussion and examples from business domain, see [50,51]). This adds to the "technical complexity" dimension, which may be perceived by physicians, and as such may affect their expectations in relation to the EMR system and the respective vendor. Hence, to facilitate the diffusion of AI (in conjunction with EMRs) for informed decision-making and better health care delivery, it is of utmost importance to transmit a "convincing" message to health care providers about the value of AI for their practice. Learning from the past in terms of the historical slow diffusion of EMRs in medical practices is an indication that the legitimation strategies used by vendors may have been suboptimal in moving this agenda forward. Future legitimation strategies should integrate additional dimensions anchored around potential contributions and value of AI capabilities to medical decision-making and patient care to avoid the pitfalls faced with the diffusion of EMRs in the past.

Despite its many potential benefits, AI-driven innovation presents a variety of challenges for organizations interested in adopting AI-powered EMRs. This will necessitate new strategies on the part of vendors to ensure that they maintain their market shares. As we discussed in our paper, conventional IT innovations typically provide transparent, well-documented information on features, promise predictable behavior and user interaction as well as assure compliance with existing regulatory environments. In contrast, AI, especially the more advanced AI methods based on complex models (e.g., deep learning neural networks), are often dubbed "black boxes" because of their lack of transparency and explainability, often even to data scientists themselves [52–54]. The power of such advanced AI lies in the incredible intricacy of rules built upon millions of iterations of fine-tuning its logic [55,56]. This may be the source of uncertainty and hesitation on the part of physicians to adopt this innovation, unless adequately addressed in the strategy used by vendors.

We believe that an important future extension of our work is considering the role of AI in the context of innovation and how it will affect legitimation strategies and approaches used by vendors. First, the opacity of black box AI makes it challenging to promote the cognitive legitimacy of AI-powered innovations. As ML models are inherently adaptable and form their own decision logic situationally, and yet in an opaque manner, it becomes difficult, if not impossible, to provide a complete representation of the features and behavior of such systems. Furthermore, while the power of AI promotes certain legitimation strategies of pragmatic legitimacy (e.g., by pointing to ways AI can save time and costs), the lack of transparency and understandability of AI application may in some cases counterweigh the benefits accrued (e.g., if a physician is struggling to explain to a patient the logic behind the AI-based diagnosis [53]), thus necessitating intricate dimensions related to cognitive legitimacy.

Normative legitimacy can also be challenged by AI. Specifically, because of the inherent "black box" feature of some AI, it may inadvertently violate organizational or cultural norms – the issue may be exacerbated by the scalability of automated decision-making, which may affect many patients at once. Finally, regulative legitimacy can also be undermined by AI-driven innovation. Regulators globally (e.g., European Union's "General Data Protection Regulation 2016/679″) begin to consider the "right to explanation" as a basic human right [57]. This may require organizations adopting AI-based EMR systems to provide patients with details on the logic involved in making automated decisions; this is quite problematic when the decisions are powered by "black box" models. Furthermore, AI-based models may inadvertently violate privacy rules and norms, as the lack of transparency and understandability makes it difficult to ensure that the systems are handling personally identifiable sensitive medical data appropriately [58]. Last, accountability remains a major question in terms of leveraging AI-based EMR systems to support patient diagnosis and treatment; in situations when errors or adverse events happen, it is difficult to determine accountability leading to further complications with patient and provider insurance coverage.

The deployment of AI-based systems may necessitate the provision of appropriate skills for physicians and medical personnel, to ensure they are able to use these systems in a manner that doesn't harm patients, as well as able to provide explanations to patients about the aspects of the system when needed. This calls for "education" for all stakeholders, which may be led by vendors to enhance the diffusion of these technologies. In addition, the limitations of AI in the domain of medicine point to the need to involve humans in the AI process, as opposed to relying solely on automated solutions. This may require physicians to interact with AI and inject human prowess and expertise i.e., "doctor-in-the-loop" into the automated process (e.g., to support learning from few exceptional cases, to provide instinctive interpretation of complex patterns when dealing with "big data" scenarios, or augment AI with mundane common sense) [53,60]. Thus, EMR vendors need to consider how to reach out to these stakeholders with legitimation strategies that are adequate to satisfy their needs (e.g., in dealing with lack of behavior transparency, assurance of privacy protection, adherence to the right of explanation and ethical behavior, or facilitation of humans in the loop). Changes to the taxonomy would likely update the distribution of legitimacy codes and impact of legitimation strategies on market share, especially as AI adoption becomes widespread.

5.1. Study limitations and implications

The results of this study must be interpreted with caution because of certain methodological limitations. First, we relied on a single source (i.e., EMR vendors' websites) to capture software providers' legitimacy discourses. Future studies should consider including additional sources such as press releases and oral presentations made by vendors at trade shows for triangulation purposes [8]. Nevertheless, we believe the wealth of information that we captured online represents an appropriate starting point to examine EMR adoption from an OV perspective. A second limitation is associated with the cross-sectional nature of our study. Indeed, our data (legitimation strategies) were collected at a single point in time and, hence, did not allow us to investigate the evolution of the vendors' discourse over time and its influence on market share. Upon completion of our study, we noticed that the market share of three of the top EMR vendors (TELUS, Nightingale, and P&P) remained relatively stable over 12 months (as of January 1, 2018); yet, that of QHR went up 8 points while that of OSCAR went down 7 points. Future efforts could aim to understand if such variations are associated with changes in the vendors' legitimacy discourses. To investigate this relationship, longitudinal collection and analysis of legitimation strategies and market shares would be required. Third, our sample is limited to top EMR vendors in a single Canadian province. Hence, future research may investigate legitimation strategies adopted by EMR vendors in other countries, which will support cross-regional comparisons. Each health care system has its own particularities in relation to financing, insurance, and care delivery. Investigating the legitimation strategies employed by vendors in different types of health care systems will be insightful, especially that the adoption of EMR systems can vary considerably between these contexts. Fourth, although our analysis was limited to one group of technology, EMR systems constitute the backbone of health care delivery in primary care settings [32]. These systems are considered as primary drivers for improving quality and measurement, coordinating patient care, and enhancing patient engagement [59]. We thus recognize the importance and relevance of investigating this type of technology, but also recommend that future studies examine the legitimation strategies in relation to other types of health IT innovations. Last, our analysis is confined to a single group of innovation entrepreneurs, namely, IT vendors. We

[1] https://www.gartner.com/smarterwithgartner/gartner-top-10-strategic-technology-trends-for-2019/

concur with Kaganer et al. [10] that other stakeholders including consultants and industry analysts also play important roles in shaping efforts to build legitimacy for core IT innovations, such as EMR systems. As such, the discourse of these stakeholders, which may differ from that of software providers, should be considered in future studies.

Notwithstanding these limitations, our study makes a number of important contributions to theory and practice. While we believe that OV theory offers a sound conceptual foundation and rich analytical tool for deepening research into IT innovation diffusion, the current understanding of the functions performed by OVs is limited and has received little empirical attention. Similarly, the strategies, that IT vendors engage in to enable these functions, have not been addressed in a systematic fashion in the extant literature. The present study contributes to knowledge development on this topic by focusing on the *legitimation* function of OV. At the theoretical level, we provide additional support to the four salient forms of legitimacy strategies identified by Kaganer et al. [10] and, hence, we have contributed to building a cumulative body of knowledge on the subject. While it may appear that the original taxonomy is generalizable to other heath IT innovations, its generalizability to innovations in other industries merits further attention from researchers. We believe the original taxonomy (and our own findings) can be extended to better echo the specificities of different IT innovations, such as open source software, and highly disruptive innovations, such as AI. Hence, future research should build on this study and investigate the legitimation strategies adopted by various stakeholders in relation to different types of health IT innovations. For example, the strategies adopted by vendors for technologies used by patients in the community (e.g., wearables, mobile devices) may differ significantly from strategies used by vendors for disruptive technologies like AI. With the increasing life expectancy and the growing elderly population worldwide, we expect a new wave of health IT innovations geared to support the delivery of care beyond the boundaries of health care organizations. Future studies should leverage the existing bulk of knowledge on legitimation strategies to predict and understand how these strategies will shape the adoption and diffusion of consumer health IT innovations.

From a practical standpoint, EMR vendors do not refer much to the value related to the system, nor the potential implementation challenges and risks associated with their respective innovation (i.e., know-how). They seem to consider "system implementability" (Markus and Keil, 1994) to be the sole responsibility of the adopting organization. Instead, their discourse is mainly about what EMRs are (i.e., know-what). This may have contributed to the slow diffusion of these systems in healthcare in general, and in physicians' medical practices in particular. With the advancement in analytics capabilities, EMR vendors should carefully consider revised strategies that bring forward the value of their systems and AI in general and contribute to the education of targeted users. Future studies should investigate whether IT vendors whose legitimacy discourse captures the *know-what*, *know-why,* and *know-how* (as discussed above) perform better in terms of market share than those (like EMR vendors) whose discourse mainly focuses on the *know-what*.

6. Conclusion

By unveiling the legitimation strategies used by the EMR vendors, this research reveals that limited efforts are used to explain to family physicians the value of these systems, which may have been associated with the observed slow rate of adoption of EMRs in primary care settings. As AI becomes a component of EMR systems, it is important that vendors learn from past practice and adopt more proactive approaches to demonstrate the value of their innovation from the perspective of physicians, which may impact their market shares.

Authors contributions

GP, JM, MJ and HT contributed equally to the conception and design of this study as well as data collection and data analysis. RL mainly contributed to the discussion related to artificial intelligence. All authors have read and approved the final manuscript and they have agreed to be personally accountable for their own contributions and to ensure that questions related to the accuracy or integrity of any part of the work, even ones in which the author was not personally involved, are appropriately investigated, resolved, and the resolution documented in the literature.

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Appendix A. Taxonomy of IT legitimation strategies (from [10])

Type of legitimacy	Strategy code	Strategy name	Strategy description
Cognitive	C1	System – functionality	Explicitly define key features, attributes, and usage conditions of the innovation
	C2	System – configuration	Explicitly define key characteristics of the underlying IT artifact
	C3	System – characteristics	Describe characteristics of the innovation that are in alignment with current technological best practices
	C4	Implementation – strategies	Describe implementation strategies/success factors
	C5	Implementation – success story	Demonstrate implementation success (examples)
	C6	Implementation – challenges	Discuss challenges/risks associated with innovation
	C7	Diffusion – organizational	Describe positive market response to innovation; emphasize ongoing development of innovation
	C8	Diffusion – end user	Stress acceptance of innovation by end users

Pragmatic	P1	Value – clinical – rationale	Explain how innovation improves the quality of medical care in an adopter organization
	P2	Value – clinical – success story	Provide examples of how innovation improves the quality of medical care in an adopter organization
	P3	Value – financial – rationale	Explain how innovation improves financial performance of an adopter organization
	P4	Value – financial – success story	Provide examples of how innovation improves financial performance of an adopter organization
	P5	Value – operational – rationale	Explain how innovation improves operational performance of an adopter organization
	P6	Value – operational – success story	Provide examples of how innovation improves operational performance of an adopter organization
	P7	Value – business – rationale	Explain how innovation improves general business performance of an adopter organization
	P8	Value – business – success story	Provide examples of how innovation improves general business performance of an adopter organization
	P9	Value – IT – rationale	Explain how innovation improves the management of IT in an adopter organization
	P10	Value – IT – success story	Provide examples of how innovation improves the management of IT in an adopter organization
	P11	Alliance – adopter	Advertise collaborative long-term relationships with adopters
	P12	Alliance – vendor	Advertise partnerships/collaborations with other innovation entrepreneurs (e.g., vendors, consultants)
	P13	Alliance – field-level actor	Advertise affiliation with influential field level actors
	P14	Reputation – vendor	Emphasize the innovation entrepreneurs' strong reputation in the innovation domain and related areas
	P15	Reputation – adopter	Describe (favorable) characteristics/stress reputation of the adopter organizations
Normative	N1	Normative – moral	Stress congruence of the innovation with the prevailing moral norms (e.g., well-being of patients); provide examples
	N2	Normative – transformation	Emphasize the ongoing transformation of the adopters' industry; stress the enabling role of innovation
Regulative	R1	Regulative – compliance	Stress compliance with legal and quasi-legal rules and regulations

Appendix B. Detailed analysis of EMR and CPOE vendors' legitimacy discourses

Forms of legitimacy	Strategies	Rankings (EMR vendors)	Rankings (CPOE vendors)	Central arguments found in EMR and CPOE vendors' discourses
Cognitive	C1	#2	#3	Statements used by both groups of vendors comprise laundry lists of features, suite descriptions and details about how particular system functionality works. In the case of CPOE, however, we found lists of clinical units where CPOE systems are usually in use (e.g., intensive care unit, general care floors, emergency room, operating rooms, and recovery rooms).
	C2	#4	#4	Both EMR and CPOE vendors used similar statements or arguments concerning the specificities of their software/hardware architecture, the characteristics of the databases behind their solutions, and outsourcing opportunities created by cloud-based systems.
	C3	#1	#6	Both groups of vendors referred to performance indicators of interoperability, scalability, reliability, security, and user-friendliness in their discourses.
	C4	#11	#12	EMR and CPOE vendors explained how they solicit feedback from, work closely with and support clinicians at all stages of the implementation process to ensure user acceptance. One of the key arguments used by both groups to promote user acceptance refers to the provision of user training. The importance of having intuitive interfaces was found in EMR vendors' discourses. For their part, CPOE vendors used other arguments to promote user acceptance (e.g., tailoring the system to the unique workflow of a particular clinical environment) and to alleviate high startup investments (e.g., sharing the cost of infrastructure and management among a group of facilities, and rolling out through incremental investments). Interestingly, CPOE vendors mentioned the use of proprietary implementation methodologies to ensure implementation success.
	C5	#15	#14	Both groups developed success stories based on elements such as smooth and seamless migration and high level of user satisfaction. They also underscored their role in ensuring successful implementation of their IT products. Success stories built by CPOE vendors included elements such as on-time activation, on-budget, or under-budget project completion, and high adoption rates. One EMR vendor emphasized the fact that a client was able to participate with the vendor's EMR community by sharing with it the enhancements brought to the system open source code by the client's IT team during implementation.
	C6	–	#23	See Results section.
	C7	#12	#2	Two EMR vendors referred to this strategy in their discourses. Contrarily to CPOE vendors, EMR providers did not characterize adopting organizations as setting themselves apart from nonadopters, nor did they announce new releases or upgrades of their IT solutions.
	C8	#13	#13	Both EMR and CPOE vendors highlighted the wide diffusion of their IT solutions in the industry and their acceptance by end users.

Pragmatic	P1	#7	#1	Both groups of vendors emphasized the clinical value associated with their IT solutions (e.g., patient safety, quality of care, and medical error prevention). This represents the most used legitimacy strategy by CPOE vendors, most likely because CPOEs are first and foremost clinical decision support systems.
	P2	–	#18	See Results section.
	P3	#8	#10	EMR and CPOE vendors alike referred to aspects of cost-effectiveness, financial performance/savings and process optimization in their discourses.
	P4	–	#24	See Results section.
	P5	#3	#7	EMR vendors emphasized the operational value of their systems from a medical clinic perspective (e.g., staff productivity and efficiency). For their part, CPOE vendors emphasized the value for the whole continuum of care. This result is related to the definition of a CPOE: an "information system that enables a patient's care provider to enter orders […] and requests […], which are then transmitted […] for fulfillment" ([10], p. 11).
	P6	#16	#20	Both EMR and CPOE vendors emphasized physician productivity. Improvements in hospital-wide cycle times were also found in several CPOE vendors' discourses.
	P7	#17	#21	Both groups talked about business/financial performance to highlight the legitimacy of their respective IT products.
	P8	–	#25	See Results section.
	P9	–	#17	See Results section.
	P10	#19	#26	The particular strategy was rarely used by both groups, as indicated by its low rankings. "Maximizing return on IT investment" may be perceived as an overstatement by IT vendors (and their potential clients).
	P11	#18	#11	Both groups of vendors advertised the collaborative and long-term relationship with client adopters. Among the specific arguments used by CPOE vendors, only strategic collaborations with clients and medical laboratories were found on EMR vendors' websites. EMR vendors did not refer to the importance of developing a common vision and sharing project success/accountability.
	P12	–	#22	See Results section.
	P13	#20	#9	CPOE vendors referred to the endorsement of their products by professional organizations, government officials and/or associations of insurers and payers and to collaborative research studies involving renowned health care organizations, researchers and professional groups. One EMR provider mentioned the endorsement of its system by professional organizations.
	P14	#6	#5	Both groups of vendors emphasized their solid reputation in the industry (e.g., leadership in a particular application area, performance record, awards, and formal recognitions). CPOE vendors also talked about the personal stature of their top executives.
	P15	–	#8	See Results section.
	P16	#9	–	See Results section.
Normative	N1	#10	#16	Both CPOE and EMR vendors used this strategy to stress the congruence of innovation with prevailing moral norms. The key arguments put forward by these vendors are the value of life, the well-being of patients, and the enhancement of work experience. One EMR vendor (OSCAR) talked about the well-being of populations and the enhancement of work experience through open, transparent, and community-based collaboration for the development and growth of the EMR system.
	N2	#14	#19	Both groups of vendors referred to the ongoing industry transformation and the enabling role of their EMR/CPOE solutions in adapting to the new conditions.
Regulative	R1	#5	#15	EMR and CPOE vendors alike emphasized compliance of their products with HIPAA16 and JCAHO17 standards as well as with rules established by state and local agencies.

Appendix C. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.im.2020.103291.

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