Thinking big about EMR: Fostering extended usage in medical practices

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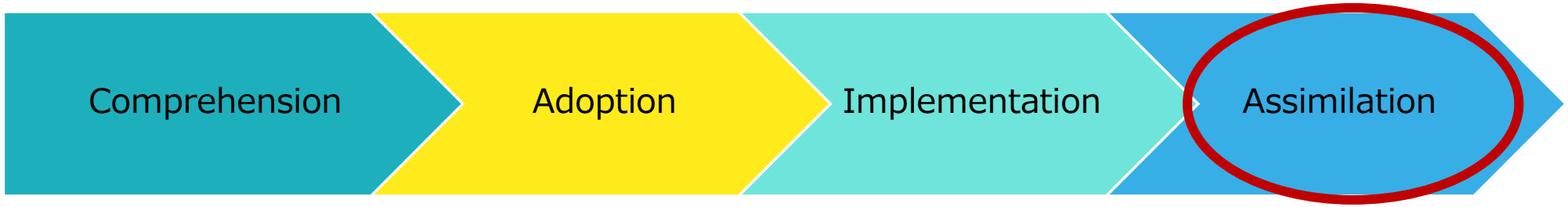
Problem statement

- Information systems (IS) have potential to reduce healthcare costs and improve clinical outcomes
- An EMR is an “amalgam of data acquired and created during a patient’s course through the healthcare system, and stored in an electronic medium”
  - Improve the quality and safety of patients care
  - Enhance the performance of primary care physicians
    - Facilitating communication and exchanges of information about their patients
- Incentive programs exist in many countries or provinces
  - HITECH in the USA, MEDCOM in Denmark, etc.

Problem statement

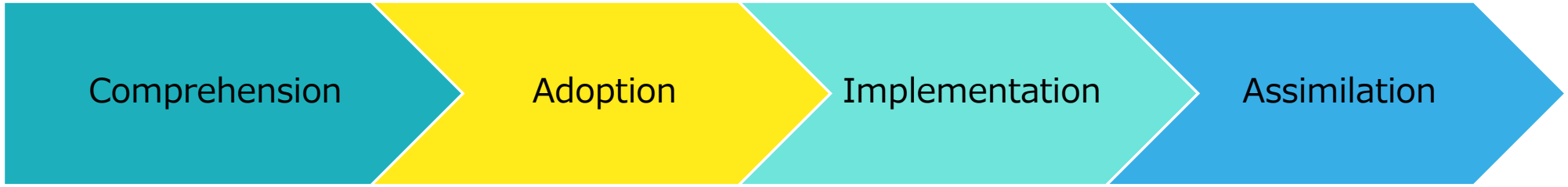
- Results found in the current literature are contradictory
- After an EMR is acquired and deployed
  - the quality and safety of care may improve, remain stable or even decline
  - efficiency gains are slow to materialize
- EMR adoption is on the rise in Canada and Quebec
- Level of assimilation, measured with maturity scales are stagnant
- Contrary to administrative and clerical duties, clinical duties are seldom fully supported by EMRs in healthcare settings

Innovation process



- The assimilation phase **begins when the EMR is used on a daily basis and it continues until complete and transparent integration of the EMR into the organization** (Swanson & Ramiller, 2004).

Innovation process



- The innovation process must be seen as a series of decisions, each of which can influence subsequent decisions. Certain choices made early in the process may thus have unexpected consequences on subsequent phases.

Recent survey of Quebec PCPs

- We studied the perceived existing functionalities
- We studied the used functionalities
  - Basic users and Advanced users

Basic Functionalities	Advanced Functionalities
Book and view appointments via EMR	CPOE
Input patient demographics, patent visits and encounter notes (no granularity)	Use of electronic alerts for drug interactions
View patient laboratory results	Reminder for guideline-based interventions
Communicate with nurses and administrative clerks	Out-of-range test levels are highlighted

Recent survey of Quebec PCP's

- We studied the perceived impacts of EMR
  - Highly, Slightly, Non impacted
- We studied the influence of contextual factors on behaviours
  - No significant difference for family physicians' experience with EMR
  - Significant difference for medical practices' experience with EMR
    - The longer they have been using their EMR, the more they have basic users

Ceiling effect

- Price et al. (2013) refer to a ceiling effect to explain the low maturity level and the untapped benefits associated with EMR assimilation
- No empirical studies have provided a clear definition of the ceiling effect or examined the elements that lead to this situation in the context of EMR assimilation
- Three distinct definitions of ceiling effects in the literature
  - The first two refer to an assessment/measurement limitation
  - The third one refers a learner parameters limitation, as it is “a maximum attainable score given [adopters’] background and available information”

Research Question

- In the context of EMR assimilation, we suggest a definition of ceiling effect as **a maximum attainable level of EMR assimilation given EMR users' background and available information**.
- We argue that a ceiling effect in EMR assimilation is created by a series of constraining conditions that occur throughout the four phases of the innovation process.

How and why do ceiling effects occur in the assimilation of EMRs within primary care medical practices?

Methods

- Multiple case studies – 5 primary care practices
- Unit of analysis – EMR innovation processes
- Discovery-oriented qualitative research approach
  - Abductive reasoning was used to combine both deduction and induction in an iterative fashion

Demographics

	Alpha	Beta	Gamma	Delta	Epsilon
Year of creation of the medical practice	1980	1970	1997	2008	1975
Year of initial EMR deployment	2005	2009	2005	2008	2010
Number of physician users	6-10	11+	6-10	11+	6-10
EMR solution in use	EMR-A	EMR-B	EMR-C	EMR-B	EMR-D
% of primary care physicians using the EMR solution	99%	100%	20%	100%	100%
Average level of EMR assimilation (5-point scale)	2.8	2.6	1.3	3.0	2.4

Data Collection

	Alpha	Beta	Gamma	Delta	Epsilon
Duration of data collection	3 days	2 days	2 days	2 days	2 days
Number of interviews	13 interviews: 1 administrative assistant, 4 secretaries, 3 nurses, 5 physicians	14 interviews: 1 administrative assistant, 2 secretaries, 4 nurses, 7 physicians	13 interviews: 1 administrative assistant, 3 secretaries, 4 nurses, 5 physicians	12 interviews: 1 administrative assistant, 5 secretaries, 1 nurse, 5 physicians	12 interviews: 1 administrative assistant, 5 secretaries, 1 nurse, 5 physicians
Approximate length of the interviews	8 hours	9 hours	7.5 hours	10 hours	5 hours
Length of transcribed interviews	320 pages	331 pages	241 pages	353 pages	213 pages
Field notes from observations	✓	✓	✓	✓	✓
Other consulted documents	5	5	3	4	4

Satisficing

- Satisficing means chosing an option that meets the specified criteria even if it is not the optimal one (Simon, 1956).
- Specified criteria relates to the initial motivations for adopting an EMR
- Three types of initial motivations in healthcare organizations (Poba-Nzaou et al. 2014)

1) Business related 2) Clinical 3) Institutional

Initial Motivations

	Business	Clinical	Institutional
Alpha	X	X	
Beta	X		
Gamma	X		X
Delta	X		
Epsilon	X		

Satisficing

- Very little knowledge of the know-why type
- Very few sources of information, clearly dominated by vendors
- Vendors' know-how translates into adopter's know-what
- In subsequent phases, no real effort was made to extend EMR use to reap benefits related to higher motivations

Organizational Inertia

- Organizational inertia is the tendency to commit to current ways of doing things and maintain the status quo in an organization (Huff, Huff and Thomas, 1992)
- Tends to increase over time (Hannan & Freeman, 1984; Huff et al., 1992; Schwenk & Tang, 1989; Tushman & Romanelli, 1985)
- Primary care physicians were using their EMR almost exclusively for basic tasks for which they relied greatly on their administrative personnel

Focal Organizations

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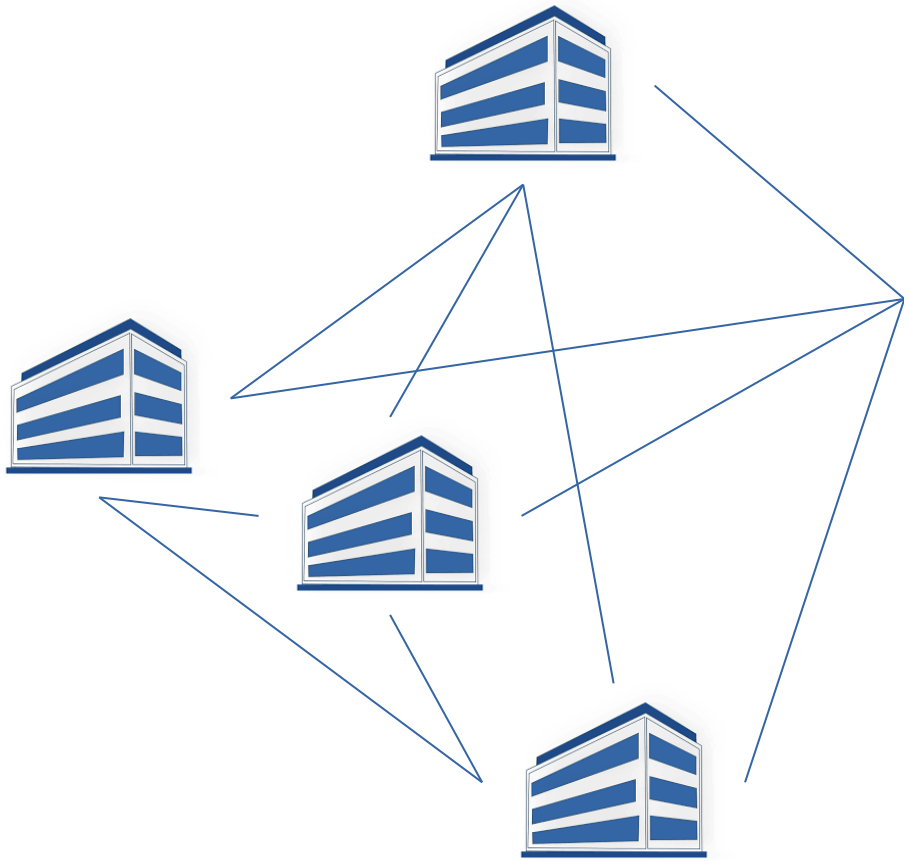
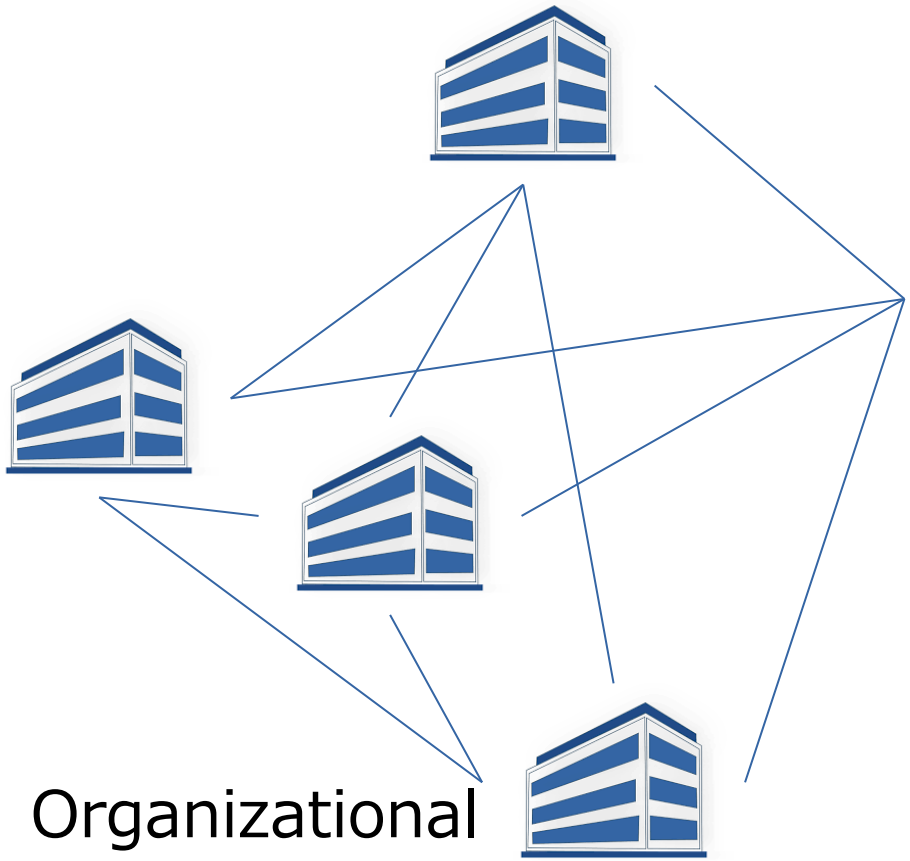
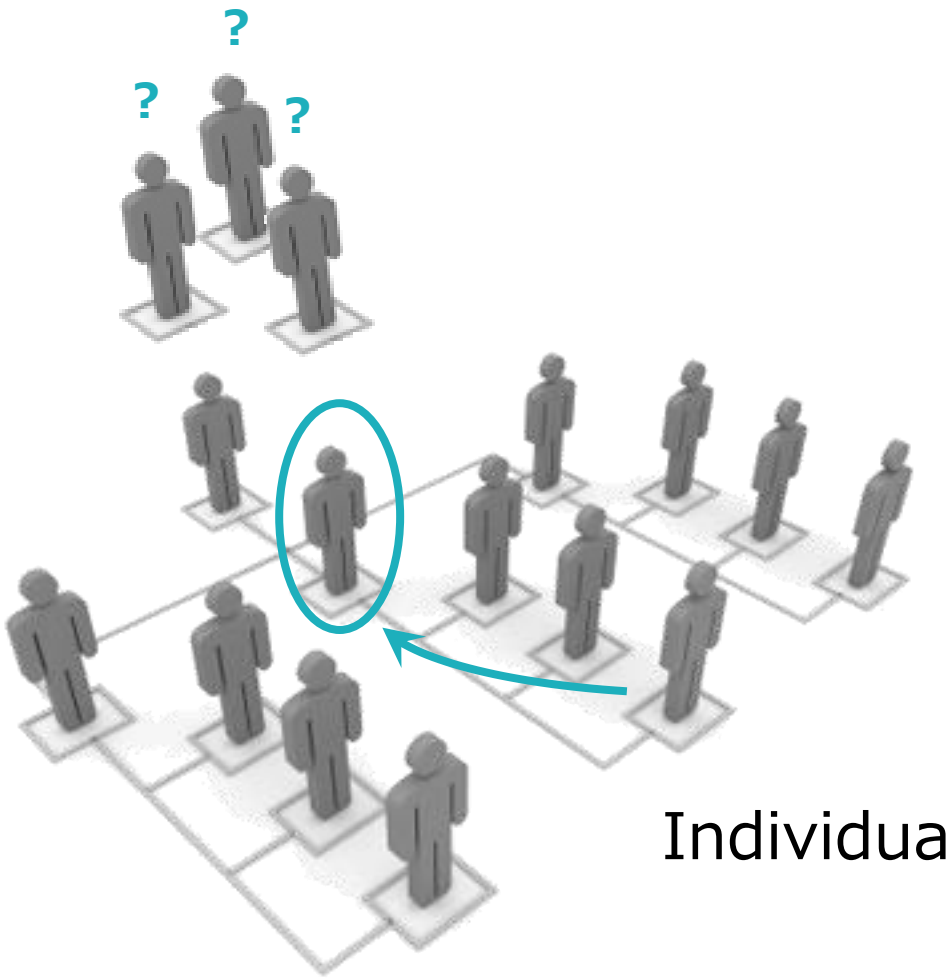


Focal Organizations



Organizational



Individual

Focal Organizations

- EMR's are used in organizations that are not typical machine bureaucracies
  - Larger ones are professional bureaucracies
  - Smaller ones are closer to loosely coupled organizations
- Contrary to a machine bureaucracy
  - A subaltern do not have the skills or the right/credibility/license to perform his superior's job
  - Autonomy rules!
  - Competition is not strong as there is a shortage of family doctors

Conclusions

How and why do ceiling effects occur in the assimilation of EMRs within primary care medical practices?

- Lack of a formalized discourse about the clinical benefits of adopting an EMR, the know-why is tenious and is mainly about administrative efficiency, satisfacing occurs
- This lack of knowledge persists throughout the later phases so that no periodical revaluation is made, giving place to organizational inertia
- Because there is no competition as there would be in typical machine bureaucracy, nothing challenges this inertia

Thank you for your attention!

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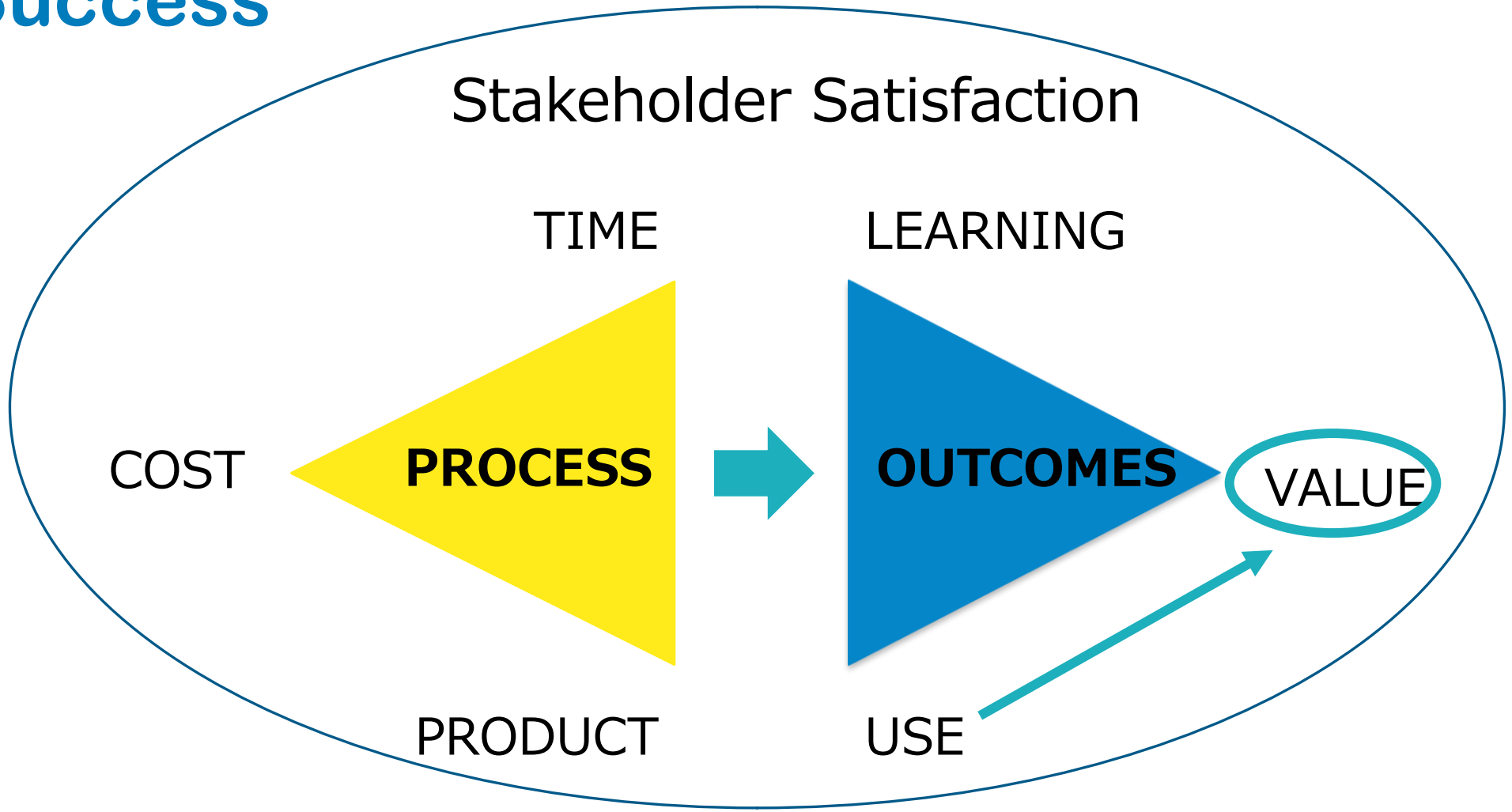

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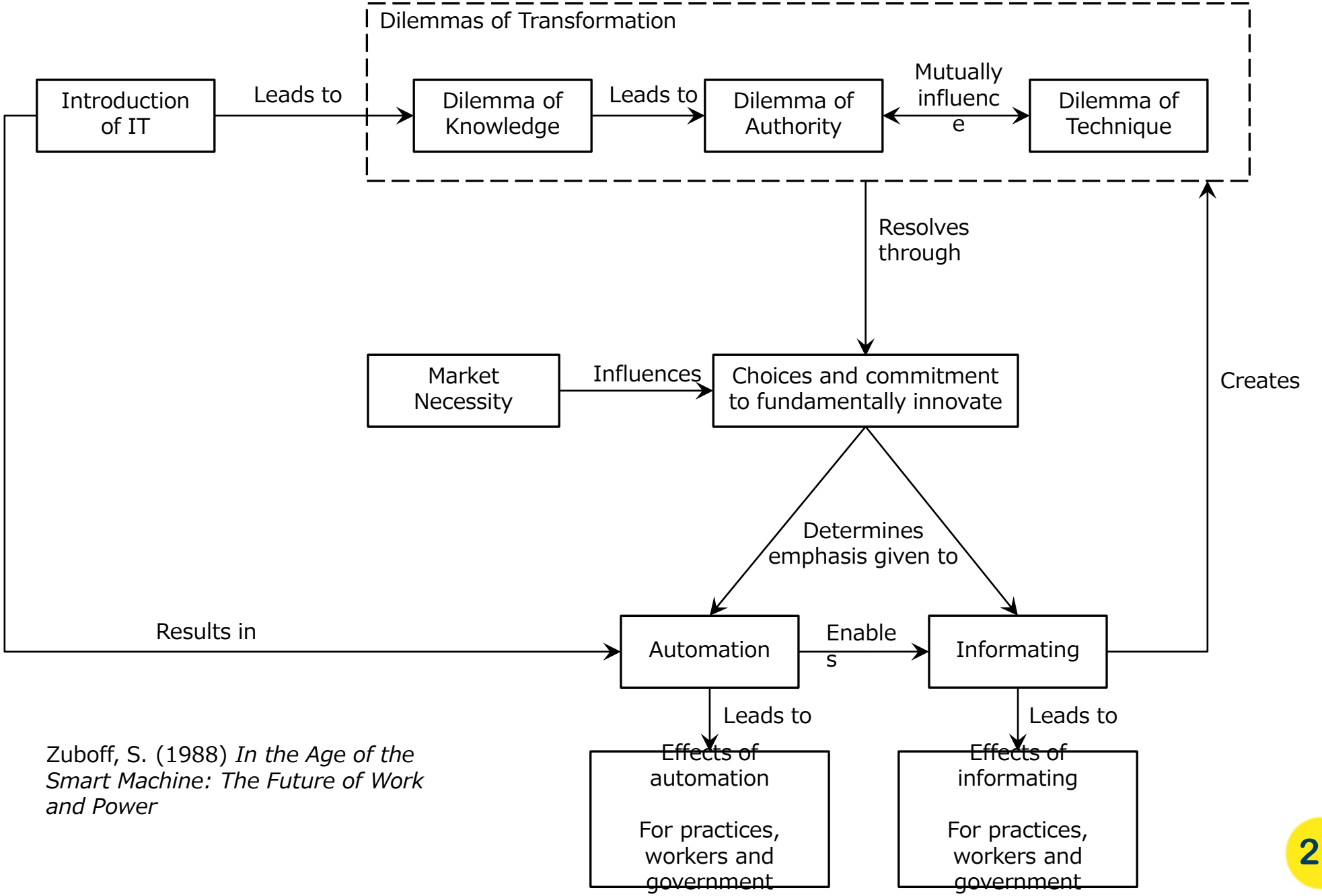

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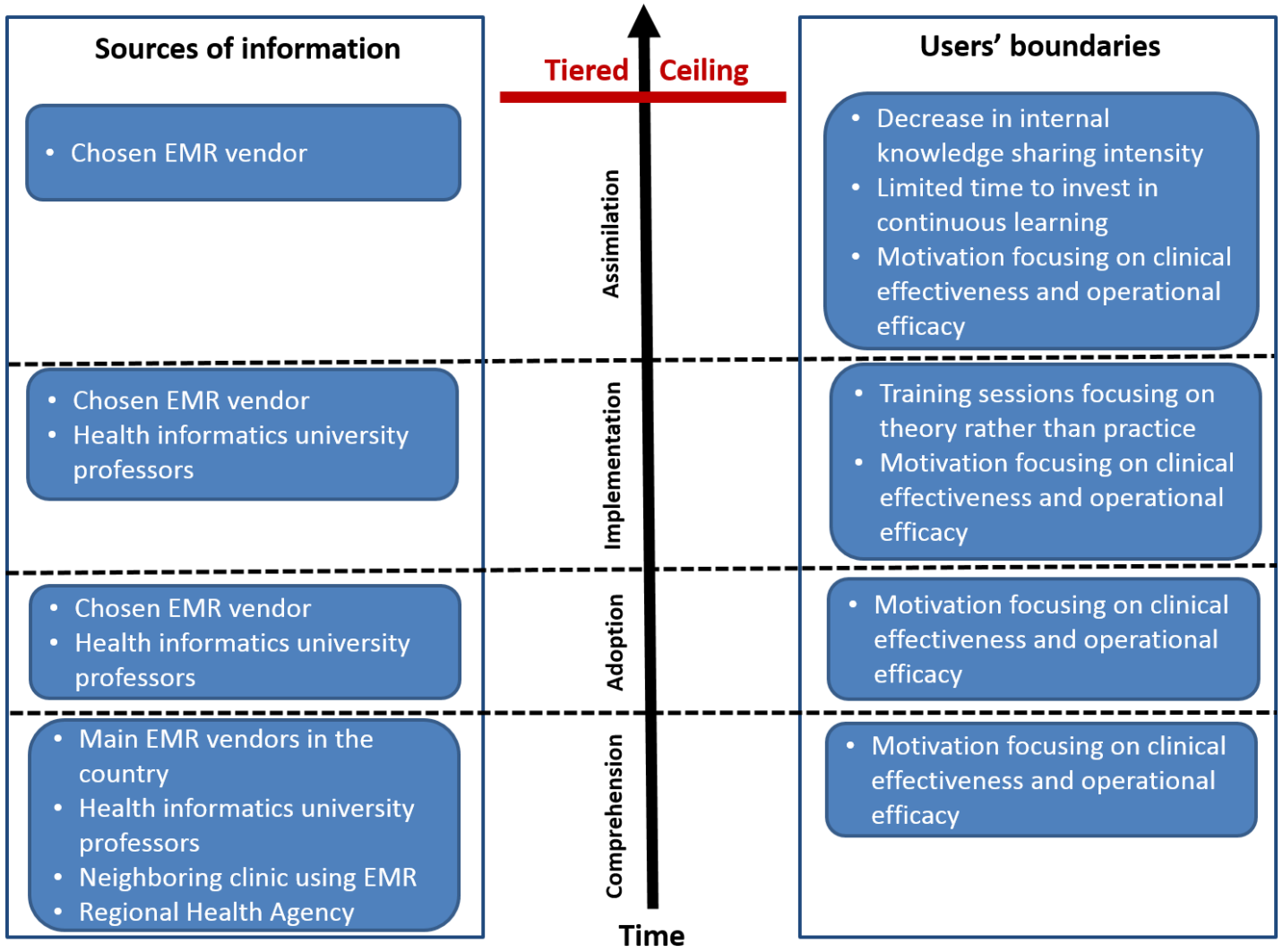
Results


Sources of information
Chosen EMR vendor
Chosen EMR vendor
Health informatics university professors
Chosen EMR vendor
Health informatics university professors
Main EMR vendors in the country
Health informatics university professors
Neighboring clinic using EMR
Regional Health Agency
Tiered
Ceiling
Assimilation
Implementation
Adoption
Comprehension
Time
Users' boundaries
Decrease in internal knowledge sharing intensity
Limited time to invest in continuous learning
Motivation focusing on clinical effectiveness and operational efficacy
Training sessions focusing on theory rather than practice
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