

MIS Quarterly Research Curation on Health Information Technology

Research Curation Team:

Aaron Baird (Georgia State University)
Corey Angst (University of Notre Dame)
Eivor Oborn (The University of Warwick)

1. Focus of the Research Curation

Health information technology (health IT) research is conducted at an intriguing intersection between societies, organizations, and consumers. Health IT is defined as “a broad concept that encompasses an array of technologies to store, share, and analyze health information.”¹ The rapid increase in adoption and use of health IT since the mid-2000s has afforded considerable research opportunities to evaluate and test existing theories (e.g., Paul and McDaniel Jr 2004) as well as to create and refine new ones (e.g., Gao et al. 2015). Such growth comes with challenges for information systems (IS) researchers, particularly with respect to staying up-to-date with the latest advances in the health IT field as well as recalling, cataloging, and understanding how it has developed over the years. In this research curation, we offer insights into how health IT research has thematically advanced over the past two decades within *MIS Quarterly* (*MISQ*).

We followed an inclusive approach for determining the scope of this research curation. Specifically, an article was included in our final dataset if it was published in *MISQ* and if it met one or both of the following criteria: 1) centrally focused on a commonly known health IT artifact (e.g., EHR, telehealth, etc.), or 2) centrally focused on health care as the primary context of interest as assessed by having health IT, health, or medically-related terms in the title, abstract, or keywords. Based on these inclusion criteria and our identification of health and health-related terms (and the semantic roots of these terms) for the search process (e.g., health, medicine, hospital, clinical, patient, doctor, physician, nurse), and after removing articles incongruent with our inclusion criteria (e.g., the article used the term “health” to refer to the health of an IS, for instance, or only referred to health or medical concepts tangentially rather than centrally), the final dataset consisted of 58 articles. These articles represent a census, to our knowledge, of health IT research published in *MISQ* from 2003 (the date of the earliest included article) to March 2020 (Volume 44, Issue 1).

In the following sections, we report on our analyses of the temporal progression (section 2) and thematic advances (section 3) of health IT research in *MISQ*. After the conclusion (section 4), we have included a table that provides details on the articles included (section 5).

2. Progression of Health IT Research in MISQ

We evaluated the temporal progression of health IT research in *MISQ* using four time periods: 1) Prior to 2007, 2) 2007 to 2012, 3) 2013 to 2018, and 4) 2019 to 2020 (Volume 44, Issue 1).

Prior to 2007 (Figure 1), much of the health IT research focused on health care as a new context for evaluating traditional IT artifacts. For instance, Dennis and Garfield (2003) considered the use of group support systems by medical project teams. Ray et al. (2005) evaluated the relationship between IT and customer service in the health insurance industry, and Mitchell

¹ Source: <https://www.healthit.gov/patients-families/basics-health-it>, Accessed May 2018.

(2006) examined how application integration in the medical sector could be used to address fragmentation of specialized knowledge. Thus, as seen in the word cloud in Figure 1, many of the primary terms and concepts during this time period were consistent with IS research done in traditional organizational contexts. At the same time, though, IS researchers were also beginning to grapple with how to overcome initial resistance to emerging health IT artifacts and how to better facilitate early health IT adoption processes (e.g., Kohli and Kettinger 2004; Lapointe and Rivard 2005). This is why terms such as resistance, trust, behaviors, and processes also appear prominently in Figure 1, as researchers were working to move beyond a focus on traditional information systems, with a more explicit focus on health-centric IT artifacts. The word cloud also suggests that researchers were grappling with the unique social context and types of informational needs and power dynamics of the health care domain. Such emerging research provided a basis for the gradual transition to more central focus on health IT artifacts in the 2007-2012 time period.

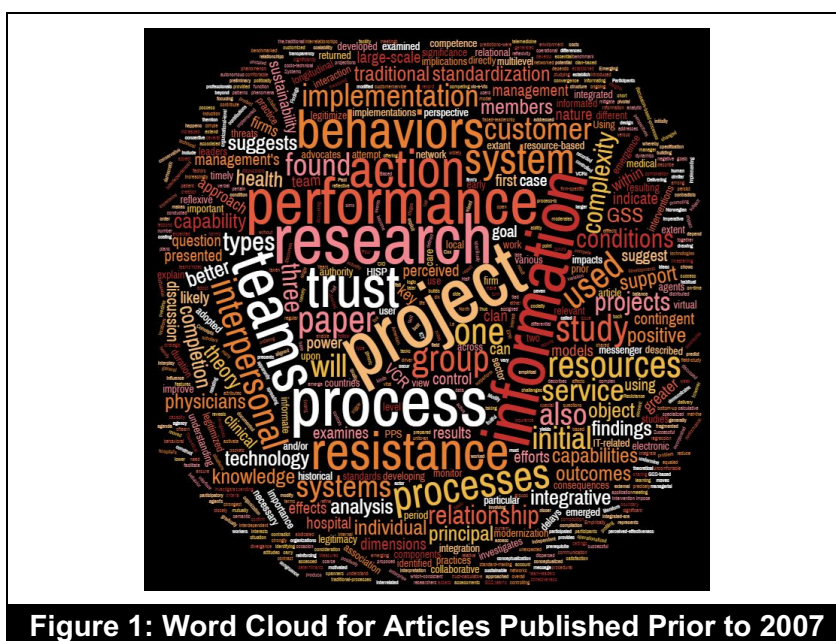


Figure 1: Word Cloud for Articles Published Prior to 2007

The 2007 to 2012 time period (Figure 2) was characterized by significant upheaval in health IT markets as governmental programs and policies were being debated and implemented to enhance health IT adoption, assimilation, and use. These programs included the Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009 and Meaningful Use (MU) policies in the U.S. and continuation of the National Programme for Information Technology (NPfIT) in the U.K. Based on the excitement from such programs, and the general nature of substantial growth in health IT markets during this time, research questions tended to focus on health IT investment decision making and governance (e.g, Xue et al. 2008), complementarities and changes necessary to benefit from health IT implementations (e.g., Davidson and Chismar 2007), consumer decision making processes associated with health IT use (e.g., Angst and Agarwal 2009), and overall impacts of health IT investments on performance (e.g., Kohli et al. 2012). Thus, the focus shifted from one of evaluating traditional IT artifacts in a new context, as was often in the case in the previous time period, to one of explicitly considering health IT artifacts and their impacts, within this time period.

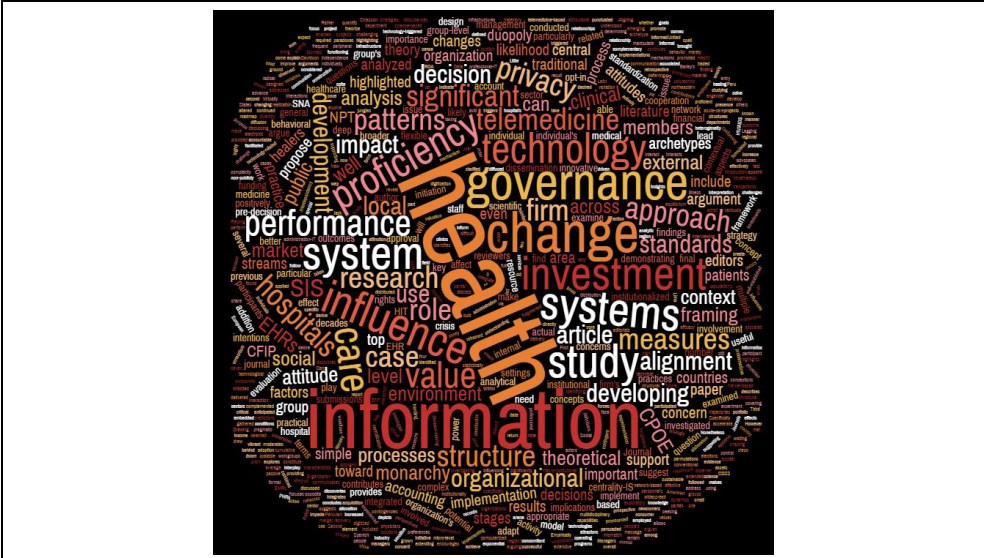


Figure 2: Word Cloud for Articles Published between 2007 and 2012

In the five-year period from 2013 to 2018 (Figure 3), the topics of interest and stakeholders considered began to significantly diversify. For instance, research in this time period was conducted on how consumers play a role in impacting perceptions of medical provider quality (e.g., Gao et al. 2015), the role of online health communities in reducing disparities (e.g., Goh et al. 2016), and how the use of health information impacted outcomes such as duplicate testing (e.g., Ayabakan et al. 2017). Further, the methods used significantly diversified with application of predictive models (e.g., Lin et al. 2017), sequence analysis (e.g., Angst et al. 2017b), growth-mixture models (e.g., Angst et al. 2017a), and in-depth qualitative efforts (e.g., Singh et al. 2015). Thus, health IT research in *MISQ* in this time-period broadened and deepened and continued to significantly contribute to IS theory and practice by pushing the boundaries of our understandings, explanations, and methodological approaches.



Figure 3: Word Cloud for Articles Published between 2013 and 2018

unique to health care that provides insights into building and applying predictive models (e.g., predictive modeling of chronic disease risk, Lin et al. 2017). Further, findings within this stream in regard to how to best allocate resources in dynamic health IT processes (e.g., use of telemedicine, Yeow and Goh 2015) and how to apply health IT toward preventing (or reducing) overuse of resources (e.g., reduce duplicate testing, Ayabakan et al. 2017) have advanced our knowledge of how to strategically apply IT toward effectiveness and efficiency.

The *health IT adoption and use* theme focuses on more granular (i.e., tactical and operational) decisions and processes related to the adoption and use of health IT.² Research within this theme has explored and evaluated challenges associated with leveraging technology to inform users (physicians) regarding use practices and outcomes (e.g., Kohli and Kettinger 2004), how to overcome user resistance (e.g., Lapointe and Rivard 2005), and how health IT impacts structures and practices in health care provider organizations (e.g., Romanow et al. 2018). More recently, this stream has diversified by considering health IT artifacts used by consumers including online intermediaries (e.g., Chan and Ghose 2014), online health care provider ratings (Gao et al. 2015), and online health communities (e.g., Goh et al. 2016). Such research has significantly advanced our understandings particularly by considering impacts of technology adoption and use on professionals (e.g., Kohli and Kettinger 2004), consumers (e.g., Chan and Ghose 2014), and even society (e.g., Goh et al. 2016). Further, this research has helped to broaden the constructs considered in IT adoption and use research and the conditions under which such constructs emerge or are most effectively applied (e.g., employee work practices and experiences of the adopting firm and technology vendor, Avgar et al. 2018).

The *health IT security and privacy* theme focuses on strategies for managing risks associated with health IT use and information sharing.³ The health care context is an excellent context for such research due to the strong emphasis within this industry in maintaining the confidentiality, integrity, and availability of protected health information. Thus, it should come as no surprise that research within this stream has considered what drives health care institutions to invest in security and privacy (e.g., Angst et al. 2017a; Kwon and Johnson 2014), how consumers view the privacy protections in place (e.g., Angst and Agarwal 2009), and techniques for enhancing privacy (e.g., Li and Sarkar 2014). Such research has advanced our understandings of privacy and security investments, application, and perceptions, particularly by showing that the framing of messages about the value of health IT can alleviate privacy concerns of consumers (patients) (e.g., Angst and Agarwal 2009), and that voluntary adoption of protections (e.g., Kwon and Johnson 2014) and semi-collaborative networks (Menon 2018) are essential predictors of security and privacy initiative success.

The *health IT for development* theme focuses on how health IT artifacts and innovations are being applied in developing countries and markets. Research within this stream has examined how the application of health IT and related innovations is contingent on the local context and requires attention to regional conditions and available resources when considering how to effectively pilot, scale, diffuse, and sustain health IT implementation and use (e.g., Miscione 2007; Srivastava and Shainesh 2015; Venkatesh et al. 2016). This has advanced theory and practice by evaluating health IT implementation and use under conditions of limited resources

² We note that another MISQ Research Curation is available on the topic of IS Use (<https://www.misqresearchcurations.org/>), which overlaps with this theme and provides additional insights into IS Use research.

³ Also refer to MISQ Research Curations on the topics of Privacy, Trust, and Securing Digital Assets (<https://www.misqresearchcurations.org/>).

and capability gaps and has also demonstrated how new generations of technologies, such as mobile technologies, can be leveraged to overcome such barriers (e.g., Ganju et al. 2016).

In regard to articles that leverage the health care context to contribute to IS in general, we established the *health as a context* theme with the health context either in the foreground or background. In categorizing these articles, we drew insight from other scholars in developing our understanding regarding the role of context.⁴ Within this theme, the ‘foreground context’ articles develop their analyses by drawing out the distinctiveness of the setting details. These foregrounded aspects of the context were found to shape the study findings, such as having remote or geographically dispersed regions (or catchment areas) (e.g., Paul and McDaniel Jr 2004; Serrano and Karahanna 2016), or non-traditional organizational settings, such as home health care (e.g., Nielsen et al. 2014). Other articles foregrounded the unique details of the health technologies being theorized (e.g. Jones 2014) or specific inter-professional tasks and features (e.g. Paul and McDaniel Jr 2004; Sergeeva et al. 2017) critical to developing the paper’s contributions. Context papers themed as ‘background context,’ did not draw out the situational details of the study’s health context in developing their research question or contribution. These studies took a more generalized approach to health organizations as a work context, for example examining integration of knowledge across dispersed units (Mitchell 2006) and group IS proficiency (Kane and Borgatti 2011). More recently, an emphasis on chronic disease has emerged, particularly due to the Special Issue on “The Role of Information Systems and Analytics in Chronic Disease Prevention and Management” (Bardhan et al. 2020).

We note that a new theme appears to be emerging focused on the impact of health IT and analytics on patient behaviors and outcomes (i.e., *impact on patients*). For instance, some of the most recent studies evaluate impacts on asthma management (Son et al. 2020; Zhang and Ram 2020) and general self-management of health (Jiang and Cameron 2020; Savoli et al. 2020).

4. Conclusion

Health IT research has significantly advanced IS theory and practice at-large. Our evaluation of health IT research published within *MISQ* provides insights into the progression and thematic advances of this research stream. Looking to the future, health IT research shows no signs of abating, as calls for additional research continue to be published (e.g., Kohli and Tan 2016) and we continue to build upon prior efforts (e.g., Romanow et al. 2012). Based on these trends, we see the future of health IT research as significant, impactful, and beneficial to the IS community at large.

⁴ Burton-Jones, A. and Volkoff, O. 2017. How can we Develop Contextualized Theories of Effective Use? A Demonstration in the Context of Community-Care Electronic Health Records. *Information Systems Research* (28:3), pp. 468-489.
Hong, W., Chan, F. K., Thong, J. Y., Chasalow, L. C., and Dhillon, G. 2013. A Framework and Guidelines for Context-Specific Theorizing in Information Systems Research. *Information Systems Research* (25:1), pp. 111-136.
Johns, G. 2006. The Essential Impact of Context on Organizational Behavior. *Academy of Management Review* (31:2), pp. 386-408.

5. Table

Table 1: Health IT Articles in <i>MISQ</i> and Results of Thematic Coding				
#	Citation	Title	Thematic Cluster: Primary Theme*	Thematic Cluster: Secondary Theme(s)**
1	Dennis and Garfield (2003)	The Adoption and Use of GSS in Project Teams: Toward More Participative Processes and Outcomes	Health IT Adoption and Use	Performance and Outcomes
2	Paul and McDaniel Jr (2004)	A Field Study of the Effect of Interpersonal Trust on Virtual Collaborative Relationship Performance	Health as a Context (Foreground)	Trust Dynamics; Telemedicine
3	Braa et al. (2004)	Networks of Action: Sustainable Health Information Systems Across Developing Countries	Health IT for Development	Scaling Health IT
4	Kohli and Kettinger (2004)	Informing the Clan: Controlling Physicians' Costs and Outcomes	Health IT Adoption and Use	Overcoming Resistance
5	Lapointe and Rivard (2005)	A Multilevel Model of Resistance to Information Technology Implementation	Health IT Adoption and Use	Overcoming Resistance
6	Ray et al. (2005)	Information Technology and the Performance of the Customer Service Process: A Resource-Based Analysis	Health IT as a Strategic Asset	Performance and Outcomes
7	Mitchell (2006)	Knowledge Integration and Information Technology Project Performance	Health as a Context (Background)	Network Knowledge Flows; Performance and Outcomes
8	Hanseth et al. (2006)	Reflexive Standardization: Side Effects and Complexity in Standard Making	Health as a Context (Foreground)	Standardization Processes; Electronic Patient Records (EPRs)
9	Braa et al. (2007)	Developing Health Information Systems in Developing Countries: The Flexible Standards Strategy	Health IT for Development	Health IT Scaling

Table 1: Health IT Articles in *MISQ* and Results of Thematic Coding

#	Citation	Title	Thematic Cluster: Primary Theme*	Thematic Cluster: Secondary Theme(s)**
10	Miscione (2007)	Telemedicine in the Upper Amazon: Interplay with Local Health Care Practices	Health IT for Development	Health IT Adoption and Use; Telemedicine
11	Silva and Hirschheim (2007)	Fighting Against Windmills: Strategic Information Systems and Organizational Deep Structures	Health IT as a Strategic Asset	Structural Dynamics
12	Davidson and Chismar (2007)	The Interaction of Institutionally Triggered and Technology-Triggered Social Structure Change: An Investigation of Computerized Physician Order Entry	Health IT Adoption and Use	Structural Dynamics
13	Xue et al. (2008)	Information Technology Governance in Information Technology Investment Decision Processes: The Impact of Investment Characteristics, External Environment, and Internal Context	Health IT as a Strategic Asset	Governance of IT Investment Decisions
14	Angst and Agarwal (2009)	Adoption of Electronic Health Records in the Presence of Privacy Concerns: The Elaboration Likelihood Model and Individual Persuasion	Health IT Security and Privacy	EHR
15	Kane and Borgatti (2011)	Centrality-IS Proficiency Alignment and Workgroup Performance	Health as a Context (Background)	Performance and Outcomes
16	Romanow et al. (2012)	Riding the Wave: Past Trends and Future Directions For Health IT Research	Health IT as a Strategic Asset	Literature Review; Health IT Research Trends
17	Kohli et al. (2012)	Does Information Technology Investment Influence a Firm's Market Value? A Case of Non-Publicly Traded Healthcare Firms	Health IT as a Strategic Asset	Performance and Outcomes
18	Nielsen et al. (2014)	Theorization and Translation in Information Technology Institutionalization: Evidence from Danish Home Care	Health as a Context (Foreground)	Non-Hospital; Scaling; Institutionalization

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#	Citation	Title	Thematic Cluster: Primary Theme*	Thematic Cluster: Secondary Theme(s)**
19	Kwon and Johnson (2014)	Proactive Versus Reactive Security Investments in the Healthcare Sector	Health IT Security and Privacy	Health IT as a Strategic Asset; Performance and Outcomes; IT Investments
20	Jones (2014)	A Matter of Life and Death: Exploring Conceptualizations Of Sociomateriality in the Context of Critical Care	Health as a Context (Foreground)	Sociomateriality; Critical Care Unit (CCU)
21	Li and Sarkar (2014)	Digression and Value Concatenation to Enable Privacy-Preserving Regression	Health IT Security and Privacy	Regression Attacks
22	Chan and Ghose (2014)	Internets Dirty Secret: Assessing the Impact of Online Intermediaries on HIV Transmission	Health IT Adoption and Use	Non-Hospital; Consumer/User IT
23	Salge et al. (2015)	Investing in Information Systems: On the Behavioral and Institutional Search Mechanisms Underpinning Hospitals' is Investment Decisions	Health IT as a Strategic Asset	IT Investment
24	Srivastava and Shainesh (2015)	Bridging the Service Divide Through Digitally Enabled Service Innovations: Evidence from Indian Healthcare Service Providers	Health IT for Development	Telemedicine
25	Park et al. (2015)	Disaster Experience and Hospital Information Systems: An Examination of Perceived Information Assurance, Risk, Resilience, and HIS Usefulness	Health IT Security and Privacy	Disaster Experience
26	Gao et al. (2015)	Vocal Minority and Silent Majority: How Do Online Ratings Reflect Population Perceptions of Quality	Health IT Adoption and Use	Consumer/User IT; Performance and Outcomes
27	Singh et al. (2015)	Organizational Path Constitution in Technological Innovation: Evidence From Rural Telehealth	Health as a Context (Foreground)	Telemedicine; Innovation Paths

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#	Citation	Title	Thematic Cluster: Primary Theme*	Thematic Cluster: Secondary Theme(s)**
28	Yeow and Goh (2015)	Work Harder or Work Smarter? Information Technology and Resource Allocation in Healthcare Processes	Health IT as a Strategic Asset	Performance and Outcomes
29	Goh et al. (2016)	The Creation of Social Value: Can an Online Health Community Reduce Rural-Urban Health Disparities?	Health IT Adoption and Use	Non-Hospital IT; Consumer/User IT; Online Communities
30	Ganju et al. (2016)	Does Information and Communication Technology Lead to the Well-Being of Nations? A Country-Level Empirical Investigation	Health IT for Development	Non-Hospital; National Wellbeing; Performance and Outcomes
31	Venkatesh et al. (2016)	Combating Infant Mortality in Rural India: Evidence from a Field Study of eHealth Kiosk Implementations	Health IT for Development	Performance and Outcomes
32	Kohli and Tan (2016)	Electronic Health Records: How can IS Researchers Contribute to Transforming Healthcare?	Health IT Adoption and Use	Perspective; EHR
33	Serrano and Karahanna (2016)	The Compensatory Interaction Between User Capabilities and Technology Capabilities in Influencing Task Performance: An Empirical Assessment in Telemedicine Consultations	Health as a Context (Foreground)	Telemedicine; Performance and Outcomes
34	Lin et al. (2017)	Healthcare Predictive Analytics for Risk Profiling in Chronic Care: A Bayesian Multitask Learning Approach	Health IT as a Strategic Asset	Analytics; Performance and Outcomes
35	Angst et al. (2017a)	When Do IT Security Investments Matter? Accounting for the Influence of Institutional Factors in the Context of Healthcare Data Breaches	Health IT Security and Privacy	Health IT as a Strategic Asset

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#	Citation	Title	Thematic Cluster: Primary Theme*	Thematic Cluster: Secondary Theme(s)**
36	Angst et al. (2017b)	Antecedents of Information Systems Sourcing Strategies in US Hospitals: A Longitudinal Study	Health IT as a Strategic Asset	Sourcing Decisions
37	Ayabakan et al. (2017)	The Impact of Health Information Sharing on Duplicate Testing	Health IT as a Strategic Asset	Performance and Outcomes
38	Sergeeva et al. (2017)	Through the Eyes of Others: How Onlookers Shape the Use of Technology at Work	Health as a Context (Foreground)	Health IT Adoption and Use
39	Romanow et al. (2018)	CPOE-Enabled Coordination: Appropriation for Deep Structure Use and Impacts on Patient Outcomes	Health IT Adoption and Use	Structural Dynamics
40	Avgar et al. (2018)	Built to Learn: How Work Practices Affect Employee Learning During Healthcare Information Technology Implementation	Health IT Adoption and Use	Non-Hospital; Complementarities
41	Menon (2018)	Information Spillover and Semi-Collaborative Networks in Insurer Fraud Detection	Health IT Security and Privacy	Health IT as a Strategic Asset
42	Kwon and Johnson (2018)	Meaningful Healthcare Security: Does Meaningful-Use Attestation Improve Information Security Performance?	Health IT Security and Privacy	Health IT as a Strategic Asset; EHR; Meaningful Use
43	Burtch and Chan (2019)	Investigating The Relationship Between Medical Crowdfunding And Personal Bankruptcy In The United States: Evidence Of A Digital Divide	Health as a Context (Background)	Digital Divide; Crowdfunding
44	James et al. (2019)	Using Organismic Integration Theory To Explore The Associations Between Users' Exercise Motivations And Fitness Technology Feature Set Use	Health IT Adoption and Use	Wearable Health IT

Table 1: Health IT Articles in *MISQ* and Results of Thematic Coding

#	Citation	Title	Thematic Cluster: Primary Theme*	Thematic Cluster: Secondary Theme(s)**
45	Karahanna et al. (2019)	Capitalizing On Health Information Technology To Enable Digital Advantage In US Hospitals	Health IT Adoption and Use	Digital Divide; Hospital; Capital
46	Huang et al. (2019)	Sharing Is Caring: Social Support Provision And Companionship Activities In Healthcare Virtual Support Communities	Health IT Adoption and Use	Online Health Communities; Social Capital; Informational and Emotional Support
47	Essén and Värlander (2019)	How Technology-Afforded Practices At The Micro-Level Can Generate Change At The Field Level: Theorizing The Recursive Mechanism Actualized In Swedish Rheumatology 2000-2014	Health IT Adoption and Use	Health IT Affordances
48	Bernardi et al. (2019)	The Role Of Affordances In The Deinstitutionalization Of A Dysfunctional Health Management Information System In Kenya: An Identity Work Perspective	Health IT for Development	Health IT Affordances
49	Bardhan et al. (2020)	Connecting Systems, Data, and People: A Multidisciplinary Research Roadmap for Chronic Disease Management	Health as a Context (Foreground)	Chronic Disease
50	Ben-Assuli and Padman (2020)	Trajectories of Repeated Readmissions of Chronic Disease Patients: Risk Stratification, Profiling, and Prediction	Health as a Context (Foreground)	Chronic Disease
51	Thompson et al. (2020)	Chronic Disease Management: How IT and Analytics Create Healthcare Value Through the Temporal Displacement of Care	Health as a Context (Foreground)	Chronic Disease; Impact on Patients
52	Liu et al. (2020b)	Go to You Tube and Call Me in the Morning: Use of Social Media for Chronic Conditions	Health as a Context (Foreground)	Chronic Disease; Impact on Patients

Table 1: Health IT Articles in *MISQ* and Results of Thematic Coding

#	Citation	Title	Thematic Cluster: Primary Theme*	Thematic Cluster: Secondary Theme(s)**
53	Son et al. (2020)	A Data Analytics Framework for Smart Asthma Management Based on Remote Health Information Systems with Bluetooth-Enabled Personal Inhalers	Health as a Context (Foreground)	Chronic Disease; Impact on Patients
54	Zhang and Ram (2020)	A Comprehensive Analysis of Triggers and Risk Factors for Asthma Based on Machine Learning and Large Heterogeneous Data Sources	Health as a Context (Foreground)	Chronic Disease; Impact on Patients
55	Savoli et al. (2020)	Examining How Chronically Ill Patients' Reactions to and Effective Use of Information Technology Can Influence How Well They Self-Manage Their Illness	Health as a Context (Foreground)	Chronic Disease; Impact on Patients
56	Liu et al. (2020a)	The Effects of Participating in a Physician-Driven Online Health Community in Managing Chronic Disease: Evidence from Two Natural Experiments	Health as a Context (Foreground)	Chronic Disease; Impact on Patients
57	Brohman et al. (2020)	Cascading Feedback: A Longitudinal Study of a Feedback Ecosystem for Telemonitoring Patients with Chronic Disease	Health as a Context (Foreground)	Chronic Disease; Impact on Patients
58	Jiang and Cameron (2020)	IT-Enabled Self-Monitoring for Chronic Disease Self-Management: An Interdisciplinary Review	Health as a Context (Foreground)	Chronic Disease; Impact on Patients

* The primary thematic clusters were assigned according to this list of themes: 1) health IT as a strategic asset, 2) health IT adoption and use, 3) health IT security and privacy, 4) health IT for development, or 5) health as a context.

** The secondary thematic clusters were not standardized and are more descriptive. They are either taken from the above list of themes and/or provide additional thematic information that was not obtained from the standardized list.

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