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MISQ Research Curation on Health Information Technology

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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*.

Our desire to fully represent the domain of health IT has guided us toward 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 *MIS Quarterly* 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 healthcare 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), our initial search yielded 56 *MIS Quarterly* articles. After carefully evaluating each of the articles, we excluded 15 of the 56 from consideration due to incongruence with our inclusion criteria (e.g., the article used the term “health” only 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 41 articles representing a census, to our knowledge, of health IT research published in *MIS Quarterly* from 2003 (the date of the earliest included article) to June 2018.

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 *MIS Quarterly*. After the conclusion (section 4), we have included a table that provides details on the articles included (section 5).

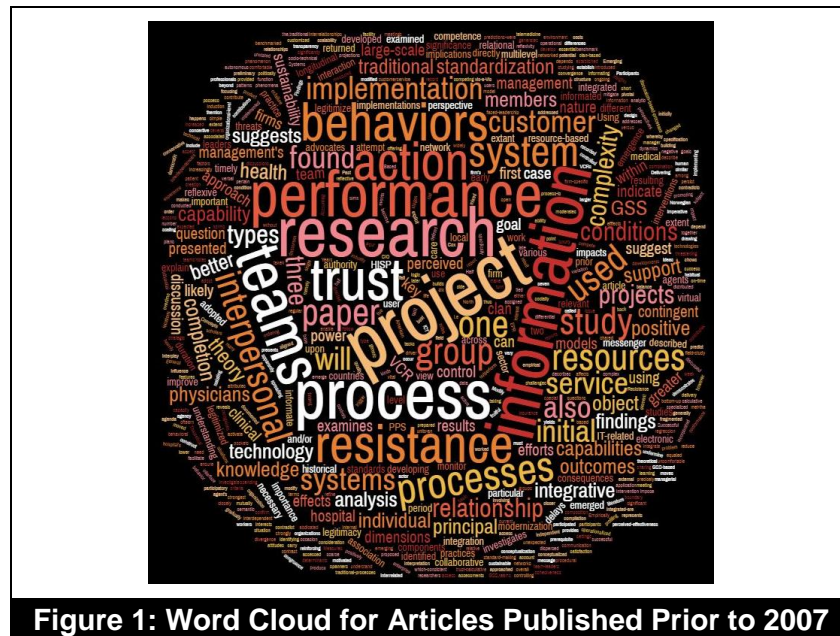
2. Progression of Health IT Research in MIS Quarterly

We evaluated the temporal progression of health IT research in *MIS Quarterly* using three time periods: 1) Prior to 2007, 2) 2007 to 2012, and 3) 2013 to June 2018.

Prior to 2007 (Figure 1), much of the health IT research focused on healthcare 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

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

relationship between IT and customer service in the health insurance industry, and Mitchell (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 healthcare 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.



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.

3. Thematic Advances in Knowledge

In our thematic analysis, we identified five (5) primary themes that have emerged within health IT research in *MIS Quarterly*: 1) health IT as a strategic asset, 2) health IT adoption and use, 3) health IT security and privacy, 4) health IT for development, and 5) health as a context.

Research within the *health IT as a strategic asset* theme focuses on evaluating strategic decisions related to health IT investments (e.g., Angst et al. 2017a; Kohli and Tan 2016; Salge et al. 2015), governance (e.g., Xue et al. 2008) and performance-related outcomes (e.g., Ayabakan et al. 2017). Research within this theme has advanced IS theory and practice by demonstrating how technology and information can be leveraged to address heterogeneity in ways not often considered in other contexts. For instance, predicting which customers (patients) are likely to be the highest consumers of resources and seeking to proactively reduce such costs is something unique to healthcare 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 healthcare 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 healthcare 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 healthcare 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 healthcare 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

² We note that another MIS Quarterly 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 MIS Quarterly Research Curations on the topics of Privacy, Trust, and Securing Digital Assets (<https://www.misqresearchcurations.org/>).

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 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 a healthcare 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, often drawing on qualitative data. 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 healthcare (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).

4. Conclusion

Health IT research has significantly advanced IS theory and practice at-large. Our evaluation of health IT research published within *MIS Quarterly* 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.
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5. Table

Table 1: Health IT Articles in MIS Quarterly 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 MIS Quarterly 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

Table 1: Health IT Articles in MIS Quarterly and Results of Thematic Coding

#	Citation	Title	Thematic Cluster: Primary Theme*	Thematic Cluster: Secondary Theme(s)**
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
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' 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

Table 1: Health IT Articles in MIS Quarterly and Results of Thematic Coding

#	Citation	Title	Thematic Cluster: Primary Theme*	Thematic Cluster: Secondary Theme(s)**
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
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

Table 1: Health IT Articles in MIS Quarterly and Results of Thematic Coding

#	Citation	Title	Thematic Cluster: Primary Theme*	Thematic Cluster: Secondary Theme(s)**
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
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
<p>* 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.</p> <p>** 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.</p>				

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