



Prosjekt kunnskapsoppsummering

Saksnummer	6-2021
Avsender	Senterleder
Møtedato	03.02.2021

Bakgrunn for saken

Som oppfølging av sak 32-2020, hvor senterets rolle i mediedebatten ble diskutert, har Nasjonalt senter for e-helseforskning sendt en litteraturoversikt til styringsgruppen som bakgrunnsinformasjon om relevante tema for Akson. Litteraturoversikten er omfattende, og dekker mange tematiske områder.

Senteret ønsker som oppfølging å lage en kunnskapsoppsummering, men som litteraturoversikten viser er temaene for omfattende og sprikende til at det vil være hensiktsmessig eller realistisk å skrive en oppsummering som dekker alle de beskrevne områdene.

Prosjektet bør innrettes mot å oppsummere kunnskap om hvordan denne typen prosjekter bør gjennomføres, og kunne gi konstruktive innspill til videre prosesser.

Senterleder ber styringsgruppen om innspill til innretning for et prosjekt og hvilke hovedspørsmål prosjektet bør ha som mål å besvare.

Forslag til vedtak

1. Styringsgruppen støtter at senteret setter i gang prosjekt som har som mål å lage en kunnskapsoppsummering som er relevant for Akson og helhetlig samhandling.
2. Styringsgruppen ber om at prosjektet innrettes i henhold til tilbakemeldingene gitt i møtet.

Vedlegg

Referanse- og dokumentliste: Arkitektur, standardisering og implementering

Referanse- og dokumentliste

Arkitektur, standardisering og implementering

Forfattere

Nasjonalt senter for e-helseforskning

Dato

21.10.20

Antall sider

25

Oppsummering

Dette er en referanse- og dokumentliste over sentral litteratur som er brukt som evidens i vitenskapelige artikler som beskriver, tolker, eller konseptualiserer faktorer, komponenter, erfaringer og strategi ved utvikling og implementering av elektronisk pasientjournalssystemer og klinisk IKT.

Utgiver

Nasjonalt senter for e-helseforskning
Postboks 35
9038 Tromsø
E-post: mail@ehealthresearch.no
Internett: www.ehealthresearch.no

Det kan fritt kopieres fra denne rapporten hvis kilden oppgis. Brukeren oppfordres til å oppgi rapportens navn, nummer, samt at den er utgitt av Nasjonalt senter for e-helseforskning og at rapporten i sin helhet er tilgjengelig på www.ehealthresearch.no.

© 2020 Nasjonalt senter for e-helseforskning



Sammendrag

Dette er en referanse- og dokumentliste over sentral litteratur som er brukt som evidens i vitenskapelige artikler som beskriver, tolker, eller konseptualiserer én eller flere av kategoriene. Dokumentet må derfor ikke tolkes som et systematisk review, eller et scoping review for litteraturen som er kategorisert for de gitte temaene under. Kategoriene i dette dokumentet er bevisst valgt for å gjengi evidens som er viktig når man skal velge retning i forbindelse med utvikling og implementeringer av elektronisk pasientjournal (EPJ) og klinisk IKT, velge komponenter i en grunnmur, og grunnlag for bruk av åpen plattform. Vi fokuserer videre på hvilke gevinster implementeringer historisk har gitt, samt hvilke implementeringer som har mislyktes. Vi framhever brukermedvirkning og betydningen av organisasjonsutvikling i implementeringsprosesser.

Formålet med dokumentet er ikke å peke på hvilke systemer som er gode eller dårlige, men heller å peke på utfordringer og faktorer som påvirker gevinstrealisering, risiko og måloppnåelse i IT-prosjekter generelt, og stor-skala implementering av (felles) EPJ spesielt. Referansene i dokumentet representerer kunnskap om hvorfor enkelte systemtyper og teknologiprojekter vanskeligere lar seg innføre i kontekster og arbeidsflyt enn andre systemtyper. Årsakene er multifaktoriell; størrelse på prosjekt, tilrettelegging for leverandør- og teknologimangfold, styringsmodeller, implementeringsstrategi og organisatoriske forhold, og arkitektur og standardisering.

Bakgrunnen for denne sammenstillingen av litteratur er økt tilgjengeliggjøring og synlighet av grunnlagsdokumentasjonen og evidensen Nasjonalt senter for e-helseforskning (NSE) bygger sitt ståsted på. NSE er et svært kompetansetungt og tverrfaglig senter, og innspillene i debatten knyttet til Akson spiller tungt på denne styrken. Det må derfor anerkjennes at denne referanse- og dokumentlisten ikke er uttømmende, men eksisterer som et levende og anvendt dokument. Dette gjenspeiles i at forskningsfronten ikke er statisk, og behovet for kontinuerlig oppdatering er derfor stort.

Innholdsfortegnelse

<i>Utvikling, design, forvaltning og rammevilkår</i>	2
<i>Arkitektur og økosystem</i>	4
<i>Standardisering</i>	16
<i>Implementering, bruk og erfaringer</i>	19
<i>Betydningen av organisasjonsutvikling ved implementering</i>	22



Utvikling, design, forvaltning og rammevilkår

Kapitlet utvikling og design har fokus på teknologi, metode, teori, og evaluering. Referansene er i stor grad knyttet til forskning på hvordan teknologier utvikles, hvilken metodikk og teoretiske konsepter kan bidra til utvikling av informasjonssystemer, og evaluering av implementering av informasjonssystemer.

1. Couffinhal, A., Cylus, J., Elovainio, R., Figueras, J., Jeurissen, P., McKee, M., Smith, P., Thomson, S., & Winblad, U. (2016). International expert panel pre-review of health and social care reform in Finland. MSAH reports and memorandum 2016:66. Helsinki: Ministry of Social Affairs and Health; 2016.
2. Hyppönen, H., Faxvaag, A., Gilstad, H., Hardardottir, G.A., Jervall, L., Kangas, M., Koch, S., Nøhr, C., Pehrsson, T., Reponen, J., & Walldius, Å (2013). Nordic eHealth Indicators: Organisation of Research, First Results and Plan for the Future. *Stud Health Technol Inform.* 192:273–277.
3. Lau, F. (2009). Extending the infoway benefits evaluation framework for health information systems. *Stud Health Technol Inform.* 143:406–13.
4. Park, S. Y., Chen, Y., & Rudkin, S. (2015). Technological and Organizational Adaptation of EMR Implementation in an Emergency Department. In *Proceedings of the ACM Transactions on Computer-Human Interaction (TOCHI)* 22,(1).
5. Villumsen, S., Faxvaag, A., & Nohr, C. (2019). Development and progression in Danish eHealth policies: towards evidence-based policy making. In: Ohno-Machado L, Séroussi B (Eds.). *MEDINFO 2019: Health and Wellbeing e-Networks for All.* IMIA IOS Press 2019;1075–1079.
6. Greenhalgh, T., et al., How do you modernize a health service? A realist evaluation of whole - scale transformation in London. *The Milbank Quarterly*, 2009. **87**(2): p. 391-416.
7. Silsand, L. and G. Ellingsen, *Generification by translation: designing generic systems in context of the local.* *Journal of the Association for Information systems*, 2014. **15**(4): p. 3.
8. Ulriksen, G.-H., R. Pedersen, and G. Ellingsen, *Infrastructuring in healthcare through the openEHR architecture.* *Computer Supported Cooperative Work (CSCW)*, 2017. **26**(1-2): p. 33-69.
9. Sweeney, J., S. McHugh, and I.J. Perry, Implementation and evaluation of a clinical data management programme in a primary care centre. *Irish Medical Journal*, 2014. **107**(10): p. 323-6.
10. Larsen, E., & Ellingsen, G. (2014). Nothing Free About Free Market. In *COOP 2014- Proceedings of the 11th International Conference on the Design of Cooperative Systems, 27-30 May 2014, Nice (France)* (pp. 69-85). Springer, Cham.
11. Windle, T., J.C. McClay, and J.R. Windle, *The impact of domain knowledge on structured data collection and templated note design.* *Applied Clinical Informatics*, 2013. **4**(3): p. 317-30.
12. Jackson, V .E. and A. Muckerman, Navigating regulatory change: preliminary lessons learned during the healthcare provider transition to ICD-10- CM/PCS. *Perspectives in Health Information Management*, 2012. **9**: p. 1d.
13. Aanestad M, Vassilakopoulou P. Innovation Readiness in Healthcare Information Infrastructures. *Key Resources to Enable Collaborative Digital Innovation.* 2019.



14. Rolland KH, Mathiassen L, Rai A. Managing digital platforms in user organizations: the interactions between digital options and digital debt. *Information Systems Research*. 2018;29(2):419-43.
15. Aanestad M, Jensen TB. Building nation-wide information infrastructures in healthcare through modular implementation strategies. *The Journal of Strategic Information Systems*. 2011;20(2):161-76.
16. Nøhr C., Koch S., Vimarlund V., Gilstad H., Faxvaag A., Hardardottir G.A., et al. (2018). Monitoring and Benchmarking eHealth in the Nordic Countries. *Stud Health Technol Inform*. 247:86–90.
17. Pollock N., & Williams R. (2010). E-Infrastructures: How Do We Know and Understand Them? *Strategic Ethnography and the Biography of Artefacts*. *Computer Supported Cooperative Work (CSCW)*, (19:6): 521-556.
- 18.
19. Larsen, E., & Mydske, P. K. (2013). Developing electronic cooperation tools: a case from Norwegian health care. *Interactive journal of medical research*, 2(1), e9.
20. Orlikowski, W. J. (1996). Improvising organizational transformation over time: A situated change perspective. *Information systems research*, 7(1), 63-92.
21. Aarts, J. (2012). Towards safe electronic health records: A socio-technical perspective and the need for incident reporting. *Health Policy and Technology*, 1(1), 8–15. <https://doi.org/10.1016/j.hlpt.2012.01.008>
22. Fitzpatrick, G., & Ellingsen, G. (2013). A Review of 25 Years of CSCW Research in Healthcare: Contributions, Challenges and Future Agendas. *Computer Supported Cooperative Work (CSCW)*, 22(4–6), 609–665.
23. Silsand, L., Severinsen, G., Ellingsen, G., & Christensen, B. (2019). Structuring Electronic Patient Record Data , a Smart Way to Extract Registry Information? In *7th International Conference on Infrastructures in Healthcare*. <https://doi.org/10.18420/ihc2019>
24. Greenhalgh, T., Stramer, K., Bratan, T., Byrne, E., Russell, J., & Potts, H. W. W. (2010). Adoption and non-adoption of a shared electronic summary record in England: a mixed-method case study. *Bmj*, 340(jun16 4), c3111–c3111. <https://doi.org/10.1136/bmj.c3111>
25. Bygstad, B. (2010). Generative mechanisms for innovation in information infrastructures. *Information and organization*, 20(3-4), 156-168.
26. Bygstad, B., & Iden, J. (2017). Styringsmodeller for digitalisering.
27. Roland, L. K., Sanner, T. A., Sæbø, J. I., & Monteiro, E. (2017). P for platform. Architectures of large-scale participatory design.



Arkitektur og økosystem

Vitenskapelige arbeid som omfatter plattformbegrepet er mangfoldig. Begrepet plattform brukes for å beskrive enkelte EPJ og integrasjoner mot nasjonale løsninger med åpne APIer i en form for samhandlingsløsning. Dette beskriver noen som en åpen plattform. Dette mener vi er feil, og har arbeidet for å etablere en mer helhetlig og beskrivende begrepsbruk, herunder et tydeligere skille på en *plattform* og en *åpen plattform*. Dermed inneholder noe av litteraturen et fokus på beskrivelse av hva en åpen plattform er, herunder leverandørmangfold og økosystem, åpne standarder og APIer, semantisk interoperabilitet i en samhandlingsløsning, og sentral datalagring. Det er videre viktig å påpeke at litteraturen ikke beskriver modne åpen plattform-installasjoner. Litteraturen i dette avsnittet og alle andre avsnitt i denne referanselisten inneholder forskning som beskriver fragmenter som til sammen utgjør det vi anser som en moderne og behovsdekkende løsning 10 år fram i tid.

28. Colicchio, T.K., J.J. Cimino, and G. Del Fiol, Unintended Consequences of Nationwide Electronic Health Record Adoption: Challenges and Opportunities in the Post-Meaningful Use Era. *J Med Internet Res*, 2019. 21(6): p. e13313.
29. Friedman CP, Wong AK, Blumenthal D. Achieving a nationwide learning health system. *Science translational medicine*. 2010;2(57):57cm29-57cm29.
30. EY. How will you design information architecture to unlock the power of data? Creating the right data environment for a connected health ecosystem. 2020.
31. Malm-Nicolaisen K, Pedersen R, Fagerlund AJ. Open or Closed: A Project Proposal for Investigating Two Different EHR Platform Approaches. *Context Sensitive Health Informatics: Sustainability in Dynamic Ecosystems*. 2019;265:207.
32. Williams A. *Best of Breed vs. Monolithic Systems: Finding the Best Software Solutions Philosophy*. 2018.
33. Byrne A. Can the road to open platform run alongside closed systems? 2917 [Available from: <https://www.digitalhealth.net/2017/11/can-the-road-to-open-platform-run-alongside-proprietary-systems/>].
34. Apperta Foundation CIC. *Defining an Open Platform*. 2017.
35. Boudreau K. Open platform strategies and innovation: Granting access vs. devolving control. *Management science*. 2010;56(10):1849-72.
36. Star SL, Ruhleder K. Steps toward an ecology of infrastructure: Design and access for large information spaces. *Information systems research*. 1996;7(1):111-34.
37. Pollock N, Williams R. *Software and organisations: The biography of the enterprise-wide system or how SAP conquered the world*: Routledge; 2008.
38. Furstenau D, Auschra C. *Open digital platforms in health care: Implementation and scaling strategies*. 2016.
39. Hanseth O, Lyytinen K. Theorizing about the design of Information Infrastructures: design kernel theories and principles. *Sprouts: Working papers on information environments, systems and organizations*. 2004;4(4):207-41.



40. Cabanes, B., Segrestin, B., Weil, B., & Le Masson, P. (2014). Understanding the Role of Collective Imaginary in the Dynamics of Expectations: The Space Industry Case Study. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2817116>
41. Baker, K. S., & Karasti, H. (2018). Data Care and Its Politics: Designing for Local Collective Data Management As a Neglected Thing. *Proceedings of the 15th Participatory Design Conference: Full Papers - Volume 1*, 10:1–10:12. <https://doi.org/10.1145/3210586.3210587>
42. Johannessen, L. K., Gammon, D., & Ellingsen, G. (2012). Users as Designers of Information Infrastructures and the Role of Generativity. *Transactions on Human-Computer Interaction THCI*, 4(2), 72–91.
43. Bygstad, B., & Hanseth, O. (2016). Governing e-Health Infrastructures: Dealing with Tensions. *ICIS 2016 Proceedings*, 1–19.
44. Newgard, C. D., Fu, R., Malveau, S., Rea, T., Griffiths, D. E., Bulger, E., ... Zive, D. (2018). ELECTRONIC HEALTH RECORDS: HOW CAN IS RESEARCHERS CONTRIBUTE TO TRANSFORMING HEALTHCARE? *Prehospital Emergency Care ISSN:*, 3127(3), 553–573. <https://doi.org/10.1080/10903127.2018.1430875>
45. Plantin, J.-C., Lagoze, C., & Edwards, P. N. (2018). Re-integrating scholarly infrastructure: The ambiguous role of data sharing platforms. *Big Data & Society*, 5(1), 205395171875668. <https://doi.org/10.1177/2053951718756683>
46. Norris, F. H., Stevens, S. P., Pfefferbaum, B., Wyche, K. F., & Pfefferbaum, R. L. (2008). Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. *American Journal of Community Psychology*, 41, 127–150. <https://doi.org/10.1007/s10464-007-9156-6>
47. Kuo, M. H., Sahama, T., Kushniruk, A. W., Borycki, E. M., & Grunwell, D. K. (2014). Health big data analytics: current perspectives, challenges and potential solutions. *International Journal of Big Data Intelligence*, 1(1/2), 114. <https://doi.org/10.1504/ijbdi.2014.063835>
48. Zimmerman, a. S. (2008). New Knowledge from Old Data: The Role of Standards in the Sharing and Reuse of Ecological Data. *Science, Technology & Human Values*, 33(5), 631–652. <https://doi.org/10.1177/0162243907306704>
49. Baldwin, C. Y., & Woodard, C. J. (2008). The Architecture of Platforms : A Unified View.
50. Bossen, C., Pine, K. H., Cabitza, F., Ellingsen, G., & Piras, E. M. (2019). Data work in healthcare: An Introduction. *Health Informatics Journal*, 25(3), 465–474. <https://doi.org/10.1177/1460458219864730>
51. Aula, V. (2019). Institutions, infrastructures, and data friction – Reforming secondary use of health data in Finland. *Big Data & Society*, 6(2), 205395171987598. <https://doi.org/10.1177/2053951719875980>
52. Gartner. (2014). Engagement for the Norwegian Directorate of Health - Commissioned by the Ministry of Health and Care Services Gartner survey of EHR suppliers and systems in the Norwegian market.
53. Winter, S., Berente, N., Howison, J., & Butler, B. (2014). Beyond the organizational “container”: Conceptualizing 21st century sociotechnical work. *Information and Organization*, 24(4), 250–269. <https://doi.org/10.1016/j.infoandorg.2014.10.003>



54. Plantin, J. C., Lagoze, C., Edwards, P. N., & Sandvig, C. (2018). Infrastructure studies meet platform studies in the age of Google and Facebook. *New Media and Society*, 20(1), 293–310. <https://doi.org/10.1177/1461444816661553>
55. Zammuto, R. F., Griffith, T. L., Majchrzak, A., Dougherty, D. J., & Faraj, S. (2007). Information technology and the changing fabric of organization. *Organization Science*, 18(5), 749–762. <https://doi.org/10.1287/orsc.1070.0307>
56. Tilson, D., Lyytinen, K., & Sørensen, C. (2010). Research Commentary —Digital Infrastructures: The Missing IS Research Agenda. *Information Systems Research*, 21(4), 748–759. <https://doi.org/10.1287/isre.1100.0318>
57. Bygstad, B. (2017). Generative innovation: A comparison of lightweight and heavyweight IT. *Journal of Information Technology*, 32(2), 180–193.
58. Ghazawneh, A., & Henfridsson, O. (2010). Governing third-party development through platform boundary resources. In *ICIS*.
59. Chase, M. D. (2011). A Look at the Future of Clinical Data Systems and Clinical Decision Support. In C. Grossmann, W. A. Goolsby, L. Olsen, & J. M. McGinnis (Eds.), *Engineering a learning healthcare system* (pp. 130–135). The National Academic Press, Washington, D.C.
60. Cuadrado, J. S., Cánovas Izquierdo, J. L., & Molina, J. G. (2014). Applying model-driven engineering in small software enterprises. *Science of Computer Programming*, 89, 176–198. <https://doi.org/10.1016/j.scico.2013.04.007>
61. Monteiro, E., Pollock, N., & Williams, R. (2014). Journal of the Association for Information Innovation in Information Infrastructures : Introduction to the Special Issue Innovation in Information Infrastructures : Introduction to the Special Issue, 15(May).
62. Millerand, F., Ribes, D., Baker, K. S., & Bowker, G. C. (2012). Making an Issue out of a Standard: Storytelling Practices in a Scientific Community. *Science, Technology & Human Values*, 38(1), 7–43. <https://doi.org/10.1177/0162243912437221>
63. Edwards, P. N., & Jackson, S. J. (2007). Understanding Infrastructure : Dynamics , Tensions , and Design. *Report of a Workshop on “History & Theory of Infrastructure: Lessons for New Scientific Cyberinfrastructures,”* (January).
64. Islind, A. S., Snis, U. L., Lindroth, T., Lundin, J., Cerna, K., & Steineck, G. (2019). The Virtual Clinic: Two-sided Affordances in Consultation Practice. *Computer Supported Cooperative Work: CSCW: An International Journal*, 28(3–4), 435–468. <https://doi.org/10.1007/s10606-019-09350-3>
65. Monteiro, E., Pollock, N., Hanseth, O., & Williams, R. (2013). From Artefacts to Formal and Informal Standard Development Organizations, (December).
66. Karasti, H., & Blomberg, J. (2017). Studying Infrastructuring Ethnographically. *Computer Supported Cooperative Work: CSCW: An International Journal*, 1–33. <https://doi.org/10.1007/s10606-017-9296-7>
67. Bloomfield, B. P., Latham, Y., & Vurdubakis, T. (2010). Bodies, technologies and action possibilities: When is an affordance? *Sociology*, 44(3), 415–433. <https://doi.org/10.1177/0038038510362469>
68. Raghupathi, W., & Raghupathi, V. (2012). Big data analytics in healthcare: promise and potential. *Communications of the ACM*, 55(10), 11. <https://doi.org/10.1145/2347736.2347741>



69. Anteby, M., Chan, C. K., & DiBenigno, J. (2016). Three Lenses on Occupations and Professions in Organizations: Becoming, Doing, and Relating. *Academy of Management Annals*, 10(1), 183–244. <https://doi.org/10.1080/19416520.2016.1120962>
70. Edwards, P. N. (2012). Knowledge Infrastructures : Intellectual Frameworks and Research Challenges, (May), 25–28.
71. Gartner. (2017). Evaluate openEHR Standards for Managing Clinical Content Across the Care Continuum.
72. Ellingsen, G. (2016). ICT governance , architecture and organisational change, (2011), 1–10.
73. Selic, B. (2003). The pragmatics of model-driven development. *IEEE Software*, 20(5), 19–25. <https://doi.org/10.1109/MS.2003.1231146>
74. Kitchin, R. (2014). Big Data, new epistemologies and paradigm shifts. *Big Data and Society*, 1(1), 1–12. <https://doi.org/10.1177/2053951714528481>
75. Hogle, L. F. (2016). Data-intensive resourcing in healthcare. *BioSocieties*, 11(3), 372–393. <https://doi.org/10.1057/s41292-016-0004-5>
76. Hovoraka, D. S., & Auerbach, N. A. (2010). Building community sustainability with geographic information systems. *16th Americas Conference on Information Systems 2010, AMCIS 2010*, 3, 2028–2036.
77. Jarrahi, M. H., Sutherland, W., Nelson, S. B., & Sawyer, S. (2020). Platformic Management, Boundary Resources for Gig Work, and Worker Autonomy. *Computer Supported Cooperative Work: CSCW: An International Journal*, 29(1–2), 153–189. <https://doi.org/10.1007/s10606-019-09368-7>
78. Tiwana, a., Konsynski, B., & Bush, a. a. (2010). Research Commentary--Platform Evolution: Coevolution of Platform Architecture, Governance, and Environmental Dynamics. *Information Systems Research*, 21(4), 675–687. <https://doi.org/10.1287/isre.1100.0323>
79. de Reuver, M., Sørensen, C., & Basole, R. C. (2017). The digital platform: a research agenda. *Journal of Information Technology*, 1–12. <https://doi.org/10.1057/s41265-016-0033-3>
80. Sun, R., Gregor, S., & Keating, B. (2015). Information Technology Platforms : Conceptualisation and a Review of Emerging Research in IS Research 1 Introduction and Background 2 Research Method, (i), 1–17.
81. Gawer, A. (2014). Bridging differing perspectives on technological platforms: Toward an integrative framework. *Research Policy*, 43(7), 1239–1249. <https://doi.org/10.1016/j.respol.2014.03.006>
82. Nikayin, F., De Reuver, M., & Itälä, T. (2013). Collective action for a common service platform for independent living services. *International Journal of Medical Informatics*, 82(10), 922–939. <https://doi.org/10.1016/j.ijmedinf.2013.06.013>
83. Ghazawneh, A., & Henfridsson, O. (2011). Micro-Strategizing in platform ecosystems: a multiple case study. In *ICIS* (pp. 1–19).
84. Williamson, P. J., & De Meyer, A. (2012). Ecosystem Advantage: How to Successfully Harness the Power of Partners. *California Management Review*, 55(1), 24–46. <https://doi.org/10.1525/cm.2012.55.1.24>



85. Msiska, B., & Nielsen, P. (2018). Innovation in the fringes of software ecosystems: the role of socio-technical generativity*. *Information Technology for Development*, 24(2), 398–421. <https://doi.org/10.1080/02681102.2017.1400939>
86. Gruber, T. (2007). Ontology of Folksonomy : A Mash-up of Apples and Oranges, 1–13.
87. Constantinides, P., & Barrett, M. (2014). Information Infrastructure Development and Governance as Collective Action, 7047, 1–17.
88. Nicolini, D., Mengis, J., & Swan, J. (2011). Understanding the Role of Objects in Cross-Disciplinary Collaboration. *Organization Science*, (2002), 1–18. <https://doi.org/10.1287/orsc.1110.0664>
89. Pilemalm, S., & Timpka, T. (2008). Third generation participatory design in health informatics--making user participation applicable to large-scale information system projects. *Journal of Biomedical Informatics*, 41(2), 327–339. <https://doi.org/10.1016/j.jbi.2007.09.004>
90. Tiwana, A. (2014). *Platform Ecosystems Aligning Architecture, Governance, and Strategy*. London: Elsevier. <https://doi.org/10.1016/B978-0-12-408066-9.09984-7>
91. Ulriksen, G. H., Pedersen, R., & Ellingsen, G. (2017). Infrastructuring in Healthcare through the OpenEHR Architecture. *Computer Supported Cooperative Work: CSCW: An International Journal*, 26(1–2), 33–69. <https://doi.org/10.1007/s10606-017-9269-x>
92. Leonardi, P. M. (2011). When flexible routines meet flexible technologies: affordance, constraint, and the imbrication of human and material agencies. *MIS Quarterly*, 35(1), 147–167.
93. Ure, J., Procter, R., Lin, Y., Anderson, S., Wardlaw, J., & Gonzalez-velez, H. (2009). Journal of the Association for Information Systems * The Development of Data Infrastructures for eHealth : A Socio-Technical Perspective, 10(May), 415–429.
94. Benkler, Y. (2007). The wealth of networks: How social production transforms markets and freedom. *Information Economics and Policy*, 19(2), 278–282. <https://doi.org/10.1016/j.infoecopol.2007.03.001>
95. Ulriksen, G., & Ellingsen, G. (2017). Governing the Archetype Work at Different Levels of Norwegian Healthcare, 1–13.
96. Iversen, T. B., Melby, L., Landmark, A. D., & Toussaint, P. (2012). Managing variations from surgical care plans: Challenges for coordination. *International Journal of Medical Informatics*, 1–11. <https://doi.org/10.1016/j.ijmedinf.2012.08.009>
97. Edwards, P. N., Jackson, S. J., Bowker, G. C., & Williams, R. (2009). Introduction: An Agenda for Infrastructure Studies. *Journal of the Association for Information Systems*, 10(May 2009), 364–374.
98. Provan, K. G., Fish, A., & Sydow, J. (2007). Interorganizational networks at the network level: A review of the empirical literature on whole networks. *Journal of Management*, 33(3), 479–516. <https://doi.org/10.1177/0149206307302554>
99. Ellingsen, G. (2004). Tightrope Walking : Standardisation Meets Local Work-Practice in a Hospital. *Group*, 2(June), 1–22.
100. Christensen, B., & Ellingsen, G. (2014). USER-CONTROLLED STANDARDISATION OF HEALTH CARE PRACTICES, 0–13.



101. Okhuysen, G. A., & Bechky, B. A. (n.d.). The Academy of Management Annals 10 Coordination in Organizations : An Integrative Perspective. *The Academy of Management Annals*, (December 2012), 37–41.
102. Atalag, K. (2007). *Archetype based domain modeling for health information systems*. The Middle East Technical University.
103. Bervall-Kåreborn, B., & Ståhlbrost, A. (2008). Participatory Design – One Step Back or Two Steps Forward? In *PDC' 2008* (pp. 102–111).
104. Goossen, W., Goossen-Baremans, A., & van der Zel, M. (2010). Detailed Clinical Models: A Review. *Healthcare Informatics Research*, 16(4), 201. <https://doi.org/10.4258/hir.2010.16.4.201>
105. Healy, K. (2012). e Performativity of Networks.
106. Hertzum, M., & Simonsen, J. (2019). Configuring information systems and work practices for each other: What competences are needed locally? *International Journal of Human Computer Studies*, 122(September 2018), 242–255.
107. Braa, J., & Hedberg, C. (2002). The Struggle for District-Based Health Information Systems in South Africa. *The Information Society*, 18(2), 113–127. <https://doi.org/10.1080/01972240290075048>
108. Ngoma, C. (n.d.). Mutual Learning during Post- implementation : A study of Designing a Maternal and Child Health Application in Rural Tanzania.
109. Andersen, S. T., & Aanestad, M. (2008). Possibilities and challenges of transition to ambulant health service delivery with ICT support in psychiatry. *IFIP International Federation for Information Processing*, 267, 129–141. https://doi.org/10.1007/978-0-387-09768-8_9
110. Markus, M. L., Steinfield, C. W., Wigand, R. T., & Minton, G. (2006). Industry-wide information systems standardization AS collective action: The case of the U.S. residential mortgage industry. *MIS Quarterly: Management Information Systems*, 30(SPEC. ISS.), 439–465. <https://doi.org/10.2307/25148768>
111. May, C., & Ellis, N. T. (2001). When protocols fail: technical evaluation, biomedical knowledge, and the social production of “facts” about a telemedicine clinic. *Social Science & Medicine* (1982), 53(8), 989–1002.
112. Car, J. et al. (2008). *The Impact of eHealth on the Quality and Safety of Healthcare: A systematic overview & synthesis of the literature*. *Communications Infrastructure. Systems and Applications in Europe*. Springer.
113. Timmermans, S., & Epstein, S. (2010). A World of Standards but not a Standard World: Toward a Sociology of Standards and Standardization *. *Annual Review of Sociology*, 36(1), 69–89. <https://doi.org/10.1146/annurev.soc.012809.102629>
114. Schmidt, K., & Simone, C. (1996). Coordination Mechanisms: Towards a Conceptual Foundation of CSCW Systems Design*. *Computer Supported Cooperative Work: The Journal of Collaborative Computing*, 5(155), 155–200. <https://doi.org/10.1007/BF00133655>
115. Santos, M. R., Bax, M. P., & Kalra, D. (2012). Dealing with the Archetypes Development Process for a Regional EHR System. *Applied Clinical Informatics*. <https://doi.org/10.4338/ACI-2011-12-RA-0074>
116. Sun, V., Aanestad, M., Skorve, E., & Miscione, G. (n.d.). Information Infrastructure Governance and Windows of Opportunity, 785(1997), 1–13.



117. Martínez-Costa, C., Menárguez-Tortosa, M., Fernández-Breis, J. T., & Maldonado, J. A. (2009). A model-driven approach for representing clinical archetypes for Semantic Web environments. *Journal of Biomedical Informatics*, 42(1), 150–164. <https://doi.org/10.1016/j.jbi.2008.05.005>
118. Bjørn, P., Burgoyne, S., Crompton, V., MacDonald, T., Pickering, B., & Munro, S. (2009). Boundary factors and contextual contingencies: configuring electronic templates for healthcare professionals. *European Journal of Information Systems*, 18(5), 428–441. <https://doi.org/10.1057/ejis.2009.34>
119. Nicolini, D. (2011). Practice as the Site of Knowing: Insights from the Field of Telemedicine. *Organization Science*, 22(3), 602–620. <https://doi.org/10.1287/orsc.1100.0556>
120. Olesen, F., & Markussen, R. (2003). Reconfigured Medication: Writing Medicine in a Sociotechnical Practice. *Configurations*, 11(3), 351–381. <https://doi.org/10.1353/con.2004.0029>
121. Kniberg, H. (n.d.). *Lean from the Trenches: Managing Large-Scale Projects with Kanban*. The Pragmatic Programmers, LLC.
122. Hovenga, E. J. S., & Garde, S. (2007). Innovative approaches and processes for capturing expert aged care knowledge for multiple purposes. *Electronic Journal of Health Informatics*, 2(1), 1–13.
123. Grisot, M., & Hanseth, O. (n.d.). Journal of the Association for Information Innovation Of , In , On Infrastructures : Articulating the Role of Architecture in Information Infrastructure Evolution Innovation Of , In , On Infrastructures : Articulating the, 15(4), 197–219.
124. Ellingsen, G., & Monteiro, E. (2003). Mechanisms for producing a working knowledge: Enacting, orchestrating and organizing. *Information and Organization*, 13(3), 203–229. [https://doi.org/10.1016/S1471-7727\(03\)00011-3](https://doi.org/10.1016/S1471-7727(03)00011-3)
125. Ellingsen, G., & Munkvold, G. (2007). Infrastructural arrangements for integrated care: implementing an electronic nursing plan in a psychogeriatric ward. *International Journal of Integrated Care*, 7(May), e13.
126. Berg, M. (1999). Accumulating and coordinating: occasions for information technologies in medical work. *Computer Supported Cooperative Work (CSCW)*, 8(4), 373–401.
127. Ellingsen, G., & Monteiro, E. (2003). Big Is Beautiful: Electronic Patient Records in Large Norwegian Hospitals 1980s – 2001. *Methods of Information in Medicine*, 42(4), 366–370.
128. Johannessen, L. K., & Ellingsen, G. (2012). Lightweight Design Methods in Integrated Practices Liv Karen Johannessen ., *Design Issues*, 28(3), 22–33.
129. Ountries, D. E. C., & Monteiro, E. (2004). Networks of action: sustainable health in information systems. *MIS Quarterly*, 28(3), 337–362.
130. Coiera, E. (2011). Why system inertia makes health reform so difficult. *British Medical Journal*, 342(jun23 1), d3693–d3693. <https://doi.org/10.1136/bmj.d3693>
131. Zittrain, J. L. (2008). *The Future of the Internet and How to Stop It*. Yale University Press & Penguin UK 2008.
132. de Laet, M., & Mol, A. (2000). The Zimbabwe Bush Pump: Mechanics of a Fluid Technology. *Social Studies of Science*, 30(2), 225–263. <https://doi.org/10.1177/030631200030002002>



133. Curtis, B., Krasner, H., & Iscoe, N. (1988). A field study of the software design process for large systems. *Communications of the ACM*, 31(11), 1268–1287.
<https://doi.org/10.1145/50087.50089>
134. Torkilsheyygi, A. á, & Hertzum, M. (2017). Incomplete by design: A study of a design-in-use approach to systems implementation. *Scandinavian Journal of Information Systems*, 29(2), 35–59.
135. Blobel, B., Goossen, W., & Brochhausen, M. (2014). Clinical modeling--a critical analysis. *International Journal of Medical Informatics*, 83(1), 57–69.
<https://doi.org/10.1016/j.ijmedinf.2013.09.003>
136. Coiera, E. (2009). Building a National Health IT System from the middle out. *Journal of the American Medical Informatics Association : JAMIA*, 16(3), 271–273.
<https://doi.org/10.1197/jamia.M3183>
137. Chase, M. D. (2011). A Look at the Future of Clinical Data Systems and Clinical Decision Support. In C. Grossmann, W. A. Goolsby, L. Olsen, & J. M. McGinnis (Eds.), *Engineering a learning healthcare system* (pp. 130–135). The National Academic Press, Washington, D.C.
138. Aanestad, M., & Jensen, T. B. (2011). Building nation-wide information infrastructures in healthcare through modular implementation strategies. *The Journal of Strategic Information Systems*, 20(2), 161–176. <https://doi.org/10.1016/j.jsis.2011.03.006>
139. Fish, R. S., Root, R. W., & Chalfonte, B. L. (1990). Informal Communication in Organizations: Form, Function, and Technology.
140. Müller, S. D., & Ulrich, F. (2013). Creativity and information systems in a hypercompetitive environment: A literature review. *Communications of the Association for Information Systems*, 32(1), 175–200. <https://doi.org/10.17705/1cais.03207>
141. Boulus, N., & Bjorn, P. (2010). A cross-case analysis of technology-in-use practices: EPR-adaptation in Canada and Norway. *International Journal of Medical Informatics*, 79(6), e97–108.
<https://doi.org/10.1016/j.ijmedinf.2008.06.008>
142. Hanseth, O., Monteiro, E., & Hatling, M. (1996). Developing Information Infrastructure : The Tension Between Standardization and Flexibility, 21(4), 407–426.
143. Monteiro, E., Pollock, N., & Williams, R. (2014). Journal of the Association for Information Innovation in Information Infrastructures : Introduction to the Special Issue Innovation in Information Infrastructures : Introduction to the Special Issue, 15(May).
144. Grimmelmann, J., & Ohm, P. (2010). Dr. Generative or: How I Learned to Stop Worrying and Love the iPhone. *Maryland Law Review*, 69, 910–953.
145. Dantec, C. a. L., & DiSalvo, C. (2013). Infrastructuring and the formation of publics in participatory design. *Social Studies of Science*, 43(2), 241–264.
<https://doi.org/10.1177/0306312712471581>
146. Pedersen, R., Ulriksen, G., & Ellingsen, G. (2015). The Contextualization of Archetypes : Clinical Template Governance, 166–171. <https://doi.org/10.3233/978-1-61499-574-6-166>
147. Ostrom, E. (2010). Polycentric systems for coping with collective action and global environmental change. *Global Environmental Change*, 20(4), 550–557.
<https://doi.org/10.1016/j.gloenvcha.2010.07.004>
148. Duftschmid, G., Rinner, C., Kohler, M., Huebner-Bloder, G., Saboor, S., & Ammenwerth, E. (2013). The EHR-ARCHE project: Satisfying clinical information needs in a Shared Electronic



- Health Record System based on IHE XDS and Archetypes. *International Journal of Medical Informatics*, 82(12), 1195–1207. <https://doi.org/10.1016/j.ijmedinf.2013.08.002>
149. Meum, T., Ellingsen, G., Monteiro, E., Wangensteen, G., & Igesund, H. (2013). The interplay between global standards and local practice in nursing. *International Journal of Medical Informatics*, 82(12), e364–e374. <https://doi.org/10.1016/j.ijmedinf.2013.02.005>
150. Balka, E., Whitehouse, S., Coates, S. T., & Andrusiek, D. (2011). Ski hill injuries and ghost charts: Socio-technical issues in achieving e-Health interoperability across jurisdictions. *Information Systems Frontiers*. <https://doi.org/10.1007/s10796-011-9302-4>
151. Atkinson, C., & Kuhne, T. (2003). Model-driven development: a metamodeling foundation. *IEEE Software*, 20(5), 36–41. <https://doi.org/10.1109/MS.2003.1231149>
152. Nygren, E., & Henriksson, P. (1992). Reading the medical record. I. Analysis of physicians' ways of reading the medical record. *Computer Methods and Programs in Biomedicine*, 39(1–2), 1–12.
153. Leonelli, S. (2013). Global data for local science: Assessing the scale of data infrastructures in biological and biomedical research. *BioSocieties*, 8(4), 449–465. <https://doi.org/10.1057/biosoc.2013.23>
154. Pedersen, R., & Ellingsen, G. (2011). The Standardized Nurse: Mission Impossible? In J. I. Chiasson, Mike; Henfridsson, Ola; Karsten, Helena; DeGross (Ed.), *Researching the Future in Information Systems IFIP WG 8.2 Working Conference, Turku, Finland, June 6-8, 2011. Proceedings* (pp. 163–178). Springer. <https://doi.org/10.1007/978-3-642-21364-9>
155. Pollock, N., & Williams, R. (2008). *Software and Organisations* (Vol. 20085774). Routledge.
156. Hanseth, O., & Lyytinen, K. (n.d.). Working Papers on Information Systems Theorizing about the Design of Information Infrastructures : Design Kernel Theories and Principles Theorizing about the Design of Information Infrastructures : Design Kernel Theories and Principles, 4(2004).
157. Vaast, E., & Walsham, G. (2009). Trans-Situated Learning: Supporting a Network of Practice with an Information Infrastructure. *Information Systems Research*, 20(4), 547–564. <https://doi.org/10.1287/isre.1080.0228>
158. Johannessen, L. K., & Ellingsen, G. (2009). Integration and Generification—Agile Software Development in the Healthcare Market. *Computer Supported Cooperative Work (CSCW)*, 18(5–6), 607–634.
159. Baker, K. S. (2004). Infrastructuring for the Long-Term: Ecological* Information Management.
160. Olsen, B. I., Lund, N. W., Ellingsen, G., & Hartvigsen, G. (2012). Document theory for the design of socio-technical systems: A document model as ontology of human expression. *Journal of Documentation*, 68(1), 100–126. <https://doi.org/10.1108/00220411211200347>
161. Lopez, D. M., & Blobel, B. G. M. E. (2009). A development framework for semantically interoperable health information systems. *International Journal of Medical Informatics*, 78(2), 83–103. <https://doi.org/10.1016/j.ijmedinf.2008.05.009>
162. Duftschmid, G., Wrba, T., & Rinner, C. (2010). Extraction of standardized archetyped data from Electronic Health Record systems based on the Entity-Attribute-Value Model. *International Journal of Medical Informatics*, 79(8), 585–597. <https://doi.org/10.1016/j.ijmedinf.2010.04.007>



163. Brunswicker, S., Rodriguez, J. A., & Wareham, J. (2014). Standardization through Formal and Informal Standard Development Organizations, (December).
164. Pedersen, R., Wynn, R., & Ellingsen, G. (2015). Semantic Interoperable Electronic Patient Records : The Unfolding of Consensus based Archetypes, 170–174. <https://doi.org/10.3233/978-1-61499-512-8-170>
165. Fledderus, E. R. (2017). Evaluation of e-Infrastructures and the development of related Key Performance Indicators, (March). <https://doi.org/10.13140/RG.2.2.13165.64488>
166. Saxena, D., & Mcdonagh, J. (2019). Evaluating ERP Implementations: The Case for a Lifecycle-based Interpretive Approach. *The Electronic Journal Information Systems Evaluation*, 22(1), 29–37.
167. Provan, K. G., & Kenis, P. (2008). Modes of network governance: Structure, management, and effectiveness. *Journal of Public Administration Research and Theory*, 18(2), 229–252. <https://doi.org/10.1093/jopart/mum015>
168. Chiasson, M., & Dexter, A. S. (2001). System development conflict during the use of an information systems prototyping method of action research: Implications for practice and research. *Information Technology & People*, 14(1), 91–108. <https://doi.org/10.1108/09593840110384799>
169. Carlile, P. R. (2004). Transferring, Translating, and Transforming: An Integrative Framework for Managing Knowledge Across Boundaries. *Organization Science*, 15(5), 555–568. <https://doi.org/10.1287/orsc.1040.0094>
170. Ellingsen, G., & Hertzum, M. (2019). User participation in the implementation of large-scale suite systems in healthcare. <https://doi.org/10.18420/ihc2019>
171. Dourish, P. (2016). Algorithms and their others: Algorithmic culture in context. *Big Data and Society*, 3(2), 1–11. <https://doi.org/10.1177/2053951716665128>
172. Zittrain, J. L. (2008). The generative internet. *Harvard Law Review*, 1974–2040.
173. Pollock, N., & Williams, R. (2010). e-Infrastructures: How Do We Know and Understand Them? Strategic Ethnography and the Biography of Artefacts. *Computer Supported Cooperative Work (CSCW)*, 19(6), 521–556.
174. Brown, N., & Michael, M. (2003). A sociology of expectations: Retrospecting prospects and prospecting retrospects. *Technology Analysis and Strategic Management*, 15(1), 3–18. <https://doi.org/10.1080/0953732032000046024>
175. Pedersen, R. (2013). *Clinical Nursing Terminology as Information Infrastructure*.
176. Robertson, a., Cresswell, K., Takian, a., Petrakaki, D., Crowe, S., Cornford, T., Sheikh, a. (2010). Implementation and adoption of nationwide electronic health records in secondary care in England: qualitative analysis of interim results from a prospective national evaluation. *Bmj*, 341(sep01 3), c4564–c4564. <https://doi.org/10.1136/bmj.c4564>
177. Henderson, D., Lunak, R., Markiewicz, E., & Tobin, C. C. (2003). Closed loop medication use system and method, 2(12).
178. Burns, L. R., & Muller, R. W. (2008). Hospital-physician collaboration: landscape of economic integration and impact on clinical integration. *The Milbank Quarterly*, 86(3), 375–434. <https://doi.org/10.1111/j.1468-0009.2008.00527.x>



179. Hanseth, O., Jacucci, E., Grisot, M., & Aanestad, M. (2006). Reflexive Standardization: Side Effects and Complexity in Standard Making. *MIS Quarterly*, 30, 1–19.
180. Rodon, J. (n.d.). Digital Infrastructure Innovation and Evolution : The Co- Functioning of Architecture , Governance and Process Strategy, 1–60.
181. Flynn, D. J., & Jazi, M. D. (1998). Constructing user requirements: a social process for a social context. *Information Systems Journal*, 8(1), 53–83. <https://doi.org/10.1046/j.1365-2575.1998.00004.x>
182. Orlikowski, W. J. (1996). Improvising Organizational Transformation over Time: A Situated Change Perspective. *Information Systems Research*, 7(1), 63–92.
183. Leonardi, P. M. (2013). When does technology use enable network change in organizations? A comparative study of feature use and shared affordances. *MIS Quarterly: Management Information Systems*, 37(3), 749–776. <https://doi.org/10.25300/misq/2013/37.3.04>
184. Berg, M. (1999). Patient care information systems and health care work: a sociotechnical approach. *International Journal of Medical Informatics*, 55(2), 87–101.
185. Gizaw, A. A., Bygstad, B., & Nielsen, P. (2017). Open generification. *Information Systems Journal*, 27(5), 619–642. <https://doi.org/10.1111/isj.12112>
186. Selic, B. (2012). What will it take? A view on adoption of model-based methods in practice. *Software & Systems Modeling*, 11(4), 513–526. <https://doi.org/10.1007/s10270-012-0261-0>
187. France, R., & Rumpe, B. (2007). Model-driven Development of Complex Software: A Research Roadmap. *Future of Software Engineering (FOSE '07)*, (2), 37–54. <https://doi.org/10.1109/FOSE.2007.14>
188. Henfridsson, O., & Bygstad, B. (2013). The generative mechanisms of digital infrastructure evolution. *MIS Quarterly*, 37(3), 907–931.
189. Star, S. L., & Ruhleder, K. (1996). Steps Toward an Ecology of Infrastructure : Design and Access for Large Information Spaces. *Information Systems Research*, 7(1).
190. Grisot, M., & Vassilakopoulou, P. (2013). Infrastructures in healthcare: the interplay between generativity and standardization. *International Journal of Medical Informatics*, 82(5), e170-9. <https://doi.org/10.1016/j.ijmedinf.2012.08.010>
191. Hanseth, O., & Lundberg, N. (2001). Designing work oriented infrastructures. *Computer Supported Cooperative Work (CSCW)*, 10(3), 347–372.
192. Johnson, M., Mozaffar, H., Marco, G., Hyysalo, S., & Pollock, N. (2013). The managed prosumer : evolving knowledge strategies in the design of information infrastructures. *Information, Communication & Society*.
193. Tilson, D., Lyytinen, K., & Sørensen, C. (2010). Research Commentary —Digital Infrastructures: The Missing IS Research Agenda. *Information Systems Research*, 21(4), 748–759. <https://doi.org/10.1287/isre.1100.0318>
194. Karasti, H., Baker, K. S., & Millerand, F. (2010). Infrastructure Time: Long-term Matters in Collaborative Development. *Computer Supported Cooperative Work (CSCW)*, 19(3–4), 377–415. <https://doi.org/10.1007/s10606-010-9113-z>
195. Bygstad, B., & Bergquist, M. (2018, January). Horizontal affordances for patient centred care in hospitals. In *Proceedings of the 51st Hawaii International Conference on System Sciences*.



196. Bygstad, B. (2015). The coming of lightweight IT.
197. Bygstad, B., Hanseth, O., Siebenherz, A., & Øvrelid, E. (2017). Process innovation meets digital infrastructure in a high-tech hospital.
198. Rolland, K. H., Mathiassen, L., & Rai, A. (2018). Managing digital platforms in user organizations: the interactions between digital options and digital debt. *Information Systems Research*, 29(2), 419-443.



Standardisering

Evidens på standardisering er en del av grunnlaget for generell evidens som sier noe om hvor vi skal med digitaliseringen. Sentralt er *hva* som skal standardiseres, *hvordan* det skal standardiseres, og på *hvilket nivå* det skal standardiseres. Dermed er dette også en del av grunnlaget for at en åpen plattform-tilnærming anbefales. Dette er igjen betinget i et fokus på semantisk interoperabilitet, strukturering av EPJ, informasjonsmodeller og datamodelering, sekundærbruk av informasjon, åpne APIer, kliniske beslutningsstøtte (CDS), kunstig intelligens (AI), naturlig språkprosessering (NLP), og terminologitjenester. Til sammen utgjør dette faktorer i forskningen som viser sentrale og nødvendige komponenter, tjenester og funksjoner i en moderne EPJ- og samhandlingsløsning, og understøtter retning til en åpen plattform.

199. Reis, Z. S. N., Maia, T. A., Marcolino, M. S., Becerra-Posada, F., Novillo-Ortiz, D., & Ribeiro, A. L. P. (2017). Is there evidence of cost benefits of electronic medical records, standards, or interoperability in hospital information systems? Overview of systematic reviews. *JMIR medical informatics*, 5(3), e26.
200. Malm-Nicolaisen, K., Ruiz, L. M., Evenstad, E. R., & Pedersen, R. (2019, November). Efforts on Using Standards for Defining the Structuring of Electronic Health Record Data: A Scoping Review. In *SHI 2019. Proceedings of the 17th Scandinavian Conference on Health Informatics, November 12-13, 2019, Oslo, Norway* (No. 161, pp. 108-115). Linköping University Electronic Press.
201. Ellingsen, G., E. Monteiro, and G. Munkvold, *Standardization of work: co-constructed practice*. The Information Society, 2007. **23**(5): p. 309-326.
202. Blumenthal, D. and M. Tavenner, *The "meaningful use" regulation for electronic health records*. *N Engl J Med*, 2010. **2010**(363): p. 501-504.
203. Moreno-Conde, A., et al., Clinical information modeling processes for semantic interoperability of electronic health records: systematic review and inductive analysis. *Journal of the American Medical Informatics Association*, 2015: p. ocv008.
204. Budrionis, A. and J.G. Bellika, *The learning healthcare system: where are we now? A systematic review*. *Journal of biomedical informatics*, 2016. **64**: p. 87-92.
205. Grannis, S.J., et al., *Evaluating the effect of data standardization and validation on patient matching accuracy*. *Journal of the American Medical Informatics Association*, 2019. **26**(5): p. 447-456.
206. Attallah, N., et al., *A Literature Review on Health Information Exchange (HIE)*. *Studies in Health Technology & Informatics*, 2016. **226**: p. 173-6.
207. Kuperman, G.J., et al., *Developing data content specifications for the nationwide health information network trial implementations*. *Journal of the American Medical Informatics Association*, 2010. **17**(1): p. 6-12.
208. Marco-Ruiz, L., et al., *Ontology-based terminologies for healthcare*. 2017, Postboks: Nasjonalt senter for e- helseforskning.



209. Oniki, T.A., et al., *Lessons learned in detailed clinical modeling at Intermountain Healthcare*. Journal of the American Medical Informatics Association, 2014. **21**(6): p. 1076-81.
210. Chronaki, C., et al., *HL7 CDA in the national ePrescription efforts of Finland & Greece: a comparison*. Studies in Health Technology & Informatics, 2012. **174**: p. 38-43.
211. Vuokko, R., et al., Impacts of structuring the electronic health record: Results of a systematic literature review from the perspective of secondary use of patient data. International Journal of Medical Informatics, 2017. **97**: p. 293-303.
212. Garcia-Jimenez, A., et al., *Clinical Decision Support using a Terminology Server to improve Patient Safety*. Studies in Health Technology & Informatics, 2015. **210**: p. 150-4.
213. Luna, D., et al., *Implementation of interinstitutional and transnational remote terminology services*. AMIA ... Annual Symposium Proceedings/AMIA Symposium, 2010. **2010**: p. 482-6.
214. Peterson, K.J., et al., *Leveraging Terminology Services for Extract-Transform-Load Processes: A User-Centered Approach*. AMIA ... Annual Symposium Proceedings/AMIA Symposium, 2016. **2016**: p. 1010-1019.
215. Pathak, J., et al., Comparing and evaluating terminology services application programming interfaces: RxNav, UMLS and LexBIG. Journal of the American Medical Informatics Association, 2010. **17**(6): p. 714-9.
216. Thoroddsen, A., M. Ehnfors, and A. Ehrenberg, Content and completeness of care plans after implementation of standardized nursing terminologies and computerized records. CIN: Computers, Informatics, Nursing, 2011. **29**(10): p. 599-607.
217. Pahl, C., et al., Role of OpenEHR as an open source solution for the regional modelling of patient data in obstetrics. Journal of Biomedical Informatics, 2015. **55**: p. 174-87.
218. Hume, S., et al., Current applications and future directions for the CDISC Operational Data Model standard: A methodological review. Journal of Biomedical Informatics, 2016. **60**: p. 352-62.
219. Gronkiewicz, C., et al., Capturing structured, pulmonary disease-specific data elements in electronic health records. Chest, 2015. **147**(4): p. 1152-1160.
220. Nagy, M., et al., *Challenges of interoperability using HL7 v3 in Czech healthcare*. Studies in Health Technology & Informatics, 2010. **155**: p. 122-8.
221. Goossen, W. and L.H. Langford, *Exchanging care records using HL7 V3 care provision messages*. Journal of the American Medical Informatics Association, 2014. **21**: p. e363-8.
222. Rea, S., et al., Building a robust, scalable and standards-driven infrastructure for secondary use of EHR data: the SHARPn project. Journal of Biomedical Informatics, 2012. **45**(4): p. 763-71.
223. Bender, D. and K. Sartipi. HL7 FHIR: An Agile and RESTful approach to healthcare information exchange. in Proceedings of the 26th IEEE international symposium on computer-based medical systems. 2013. IEEE.
224. Rasmussen, A.R. and K. Rosenbeck, *SNOMED CT implementation: implications of choosing clinical findings or observable entities*. Studies in Health Technology & Informatics, 2011. **169**: p. 809-13.
225. Kopanitsa, G., Implementation of an Archetype Data Set to Reuse Electronic Health Record Data in Clinical Decision Support Systems. Studies in Health Technology & Informatics, 2017. **245**: p. 1329.



226. Garza, M., et al., *Evaluating common data models for use with a longitudinal community registry*. Journal of Biomedical Informatics, 2016. **64**: p. 333-341.
227. Marco-Ruiz, L., et al., Publication, discovery and interoperability of Clinical Decision Support Systems: A Linked Data approach. Journal of Biomedical Informatics, 2016. **62**: p. 243-264.
228. Ellingsen G, Monteiro E. Seamless integration: standardisation across multiple local settings. Computer Supported Cooperative Work (CSCW). 2006;15(5-6):443-66.
229. Hanseth O, Bygstad B, Ellingsen G, Johannessen LK, Larsen E. ICT standardization strategies and service innovation in health care. 2012.
230. Hanseth O, Monteiro E, Hatling M. Developing information infrastructure: The tension between standardization and flexibility. Science, Technology, & Human Values. 1996;21(4):407-26.
231. Oniki TA, Coyle JF, Parker CG, Huff SM. Lessons learned in detailed clinical modeling at Intermountain Healthcare. Journal of the American Medical Informatics Association. 2014;21(6):1076-81.
232. Greenes R.A. (2014). Clinical Decision Support [Internet]. Elsevier. Available from: <http://linkinghub.elsevier.com/retrieve/pii/C20120003043>
233. Rosenbloom, S. T., Denny, J. C., Xu, H., Lorenzi, N., Stead, W. W., & Johnson, K. B. (2011). Data from clinical notes: a perspective on the tension between structure and flexible documentation. *Journal of the American Medical Informatics Association*, 18(2), 181-186.

Implementering, bruk og erfaringer

Kapitlet Implementering, bruk, og erfaring inneholder referanser som beskriver, evaluerer, og konkluderer for implementering av modne EPJ og kliniske IT-systemer. I denne delen av litteraturen finner vi evidens på om implementeringer har lyktes eller ikke, samt faktorer som påvirker implementeringsprosessen og graden av gevinstrealisering og måloppnåelse. Litteraturen beskriver hvilke planlagte gevinster man ofte bruker i forbindelse med implementeringer, og hvilke gevinster man faktisk klarer å realisere. Tematikken har i tillegg stor sammenheng med bruk og erfaringer med EPJ, altså klinikers involvering ved utvikling, planlegging og implementering.

234. Kroth, P. J., Morioka-Douglas, N., Veres, S., Pollock, K., Babbott, S., Poplau, S., ... & Linzer, M. (2018). The electronic elephant in the room: Physicians and the electronic health record. *JAMIA open*, 1(1), 49-56.
235. Priestman, W., Sridharan, S., Vigne, H., Collins, R., Seamer, L., & Sebire, N. J. (2018). What to expect from electronic patient record system implementation: lessons learned from published evidence. *Journal of Innovation in Health Informatics*, 25(2), 92-104.
236. Gawande, A. (2018). Why Doctors Hate Their Computers. Digitization promises to make medical care easier and more efficient. But are screens coming between doctors and patients? *Annals of Medicine*, 12, 2018.
- 237.
238. Greenhalgh, T., Wherton, J., Papoutsi, C., Lynch, J., Hughes, G., Hinder, S., ... & Shaw, S. (2018). Analysing the role of complexity in explaining the fortunes of technology programmes: empirical application of the NASSS framework. *BMC medicine*, 16(1), 66.
239. Braithwaite, J., Wears, R. L., & Hollnagel, E. (2015). Resilient health care: turning patient safety on its head. *International Journal for Quality in Health Care*, 27(5), 418-420.
240. Johnson, K.B. & Ehrenfeld, J.M. (2018). An EPIC switch: preparing for an electronic health record transition at Vanderbilt University Medical Center. *J Med Syst*, 42:6. Johnson, R.J. III. (2016). A comprehensive review of an electronic record system soon to assume market ascendancy: EPIC®. *J Healthcare Communications*, 1(4):36.
241. Kaipio, J., Lääveri, T., Hyppönen, H., Vainiomäki, S., Reponen, J., Kushniruk, A., Broycki, E., & Vänskä, J. (2017). Usability problems do not heal by themselves: National survey on physicians' experiences with EHRs in Finland. *Int J Med Inform.* 97:266– 81.
242. Krousel-Wood, M., McCoy, A.B., Ahia, C., Holt, E.W., Trapani, D.N., Luo, Q. et al. (2018). Implementing electronic health records (EHRs): health care provider perceptions before and after transition from a local basic EHR to a commercial comprehensive EHR. *J Am Med Inform Assoc*, 25(6):618–626.
243. Lau, F., Kuziemsky, C., Price, M., & Gardner, J. (2010). A review on systematic reviews of health information system studies. *J Am Med Inform Assoc*. 17(6):637–45.
244. Liem, J-T., Laerum, H., Schulz, T. & Faxvaag, A. (2006). From the front line, report from a near paperless hospital: mixed reception among health care professionals. *Journal of the American Medical Informatics Association: JAMIA*. 13(6):668-75



245. Makam AN, Lanham HJ, Batchelor K, Samal L, Moran B, Howell-Stampley T, Kirk L, Cherukuri M, Santini N, Leykum LK, Halm EA. Use and satisfaction with key functions of a common commercial electronic health record: a survey of primary care providers. *BMC Med Inform Dec Making* 2013;13:86. <https://doi.org/10.1186/1472-6947-13-86>
246. Laerum H., Ellingsen G., & Faxvaag A. (2001). Doctors' use of electronic medical records systems in hospitals: cross sectional survey. *BMJ (Clinical research ed)*. 323(7325):1344–8.
247. Ndifon, L., Edwards, J. E., & Halawi, L. (2016). Impact of Electronic Health Records On Patient Outcomes. *Issues in Information Systems*, 17(4).
248. Nøhr, C. (2018). Klinikernes erfaringer med brug af helse it systemer i Danmark. Presentation. Nordic eHealth Research Network, Forskning på Helseplatformen: Workshop, 12 November 2018.
249. Price M., & Lau F. (2014). e-clinical adoption meta-model: a temporal meta-model describing the clinical adoption of health information systems. *BMC Medical Informatics and Decision Making*, 14, 43.
250. Sligo, J., Roberts, V., Gauld, R., et al. (2019). A checklist for healthcare organisations undergoing transformal change associated with large-scale health information systems implementation. *Health Policy Technol*, 8:237–247.
251. Viitanen, J., Hyppönen, H., Lääveri, T., Vänskä, J., Reponen, J., & Winblad, I. (2011). National questionnaire study on clinical ICT systems proofs: physicians suffer from poor usability. *Int J Med Inform*. 80(10):708–25.
252. Berg, M., Implementing information systems in health care organizations: myths and challenges. *International Journal of Medical Informatics*, 2001. 64(2-3): p. 143-156.
253. Flyvbjerg, B. (2014). What you should know about mega-projects and why: an overview. *Project Manage J*, 45(2):6–19. Gartner. (2014).
254. Lapointe, L. and S. Rivard, A Multilevel Model of Resistance to Information Technology Implementation. *MIS Quarterly*, 2005. 29(3): p. 461- 491.
255. Melby, L. and P. Toussaint, "We walk straight past the screens": The Power of the Non-Users of a Hospital Information System, in *The New Production of Users. Changing Innovation Collective and Involvement Strategies*, S. Hyysalo, T.E. Jensen, and N. Oudshoorn, Editors. 2016, Routledge: New York.
256. Greenhalgh, T., D. Swinglehurst, and R. Stones, Rethinking resistance to 'big IT': a sociological study of why and when healthcare staff do not use nationally mandated information and communication technologies. 2014.
257. Orlikowski, W.J., Learning from notes: Organizational issues in groupware implementation. 1993.
258. Arndt, B.G., et al., Tethered to the EHR: primary care physician workload assessment using EHR event log data and time-motion observations. *The Annals of Family Medicine*, 2017. 15(5): p. 419-426.
259. Grünloh, C., Å. Cajander, and G. Myreteg, "The Record is Our Work Tool!"—physicians' framing of a patient portal in Sweden. *Journal of medical Internet research*, 2016. 18(6): p. e167.

260. Hertzum, M. and G. Ellingsen, The Implementation of an Electronic Health Record: Comparing Preparations for Epic in Norway with Experiences from the UK and Denmark. *International Journal of Medical Informatics*, 2019.
261. Larsen, E., & Ellingsen, G. (2012). Establishing a core health record; A case study from Norwegian healthcare. In *From Research to Practice in the Design of Cooperative Systems: Results and Open Challenges* (pp. 1-15). Springer, London.
262. Kruse, C.S., et al., Adoption Factors of the Electronic Health Record: A Systematic Review. *JMIR Med Inform*, 2016. **4**(2): p. e19.
263. Christensen T., Faxvaag A., Loerum H., & Grimsmo A. (2009). Norwegians GPs' use of electronic patient record systems. *Int J Med Inform.* 78(12):808–14.
264. Meeks, D. W., Takian, A., Sittig, D. F., Singh, H., & Barber, N. (2014). Exploring the sociotechnical intersection of patient safety and electronic health record implementation. *Journal of the American Medical Informatics Association*, 21(e1), e28-e34.
265. Minshall, S. (2013). A review of healthcare information system usability & safety.
266. Harrington, L., Kennerly, D., & Johnson, C. (2011). Safety issues related to the electronic medical record (EMR): synthesis of the literature from the last decade, 2000-2009. *Journal of Healthcare Management*, 56(1), 31-44.
267. Larsen, E., & Ellingsen, G. (2010, August). Facing the Lernaean Hydra: the nature of large-scale integration projects in healthcare. In *Scandinavian Conference on Information Systems*(pp. 93-110). Springer, Berlin, Heidelberg.
268. Cresswell, K. M., Robertson, A., & Sheikh, A. (2012, January). Lessons learned from England's national electronic health record implementation: implications for the international community. In *Proceedings of the 2nd ACM SIGHIT International Health Informatics Symposium* (pp. 685-690).
269. Fennelly, O., Cunningham, C., Grogan, L., Cronin, H., O'Shea, C., Roche, M., ... & O'Hare, N. (2020). Successfully implementing a national electronic health record: a rapid umbrella review. *International Journal of Medical Informatics*, 104281.
270. Bansler, J., & From, G. (2020). International experiences with electronic health records in the hospital sector. *Ugeskrift for læger*, 182(38), V03200160.
271. Purohit, K. (2020). The National Health Service's 'special measures': Cambridge—A case study. *Health Services Management Research*, 0951484820931061.
272. Cresswell, K. M., Bates, D. W., & Sheikh, A. (2013). Ten key considerations for the successful implementation and adoption of large-scale health information technology. *Journal of the American Medical Informatics Association*, 20(e1), e9-e13.



Betydningen av organisasjonsutvikling ved implementering

Betydningen av organisasjon ved implementering av informasjonssystemer er tematisk viktig; de kritiske faktorene knyttet til implementering av EPJ handler i stor grad om organisatoriske forhold, herunder organisasjonsutvikling, endringsledelse, opplæring og brukarmedvirkning, og i mindre grad om rene teknologiske forhold. Litteraturen beskriver alt fra den kulturelle arven til eksisterende systemer, samt hvilke organisatoriske grep som må gjøres i forkant og under implementering av nye systemer. Eksempelvis involverer de fleste implementeringer ikke brukere tilstrekkelig i planlegging og implementering, som beskrevet i flere av referansene under.

273. Berg M., Aarts J., & Lei J van der. (2003). ICT in Health Care: Sociotechnical Approaches. *Methods Inf Med.* 42(4):297–301.
274. Vedvik E., Tjora A.H., & Faxvaag A. (2009). Beyond the EPR: complementary roles of the hospital-wide electronic health record and clinical departmental systems. *BMC medical informatics and decision making.* 9:29.
275. Angrist J., Imbens, G., & Rubin D. (1996). Identification of Causal Effects Using Instrumental Variables. *Journal of the American Statistical Association,* 91, 444-472.
276. Burns LR, Muller RW. Hospital-physician collaboration: landscape of economic integration and impact on clinical integration. *Milbank Q.* 2008 Sep;86(3):375-434.
277. Toussaint JS, Berry LL. The promise of Lean in health care. *Mayo Clin Proc. Mayo Foundation for Medical Education and Research;* 2013 Jan;88(1):74-82.
278. Christensen B, Ellingsen G. Standardizing Clinical Pathways for Surgery Patients through ICT. In 2013.
279. Lyman J a, Cohn WF, Bloomrosen M, Detmer DE. Clinical decision support: progress and opportunities. *J Am Med Inform Assoc.* 2010;17(5):487-92.
280. Ulriksen G-H, Pedersen R, Ellingsen G. Establishing ICT Governance for Regional Information Infrastructures in Healthcare. 2016 49th Hawaii Int Conf Syst Sci. 2016;5137-46.
281. Black AD, Car J, Pagliari C, Anandan C, Cresswell K, Bokun T, et al. The Impact of eHealth on the Quality and Safety of Health Care: A Systematic Overview. Djulbegovic B, editor. *PLoS Med.* 2011 Jan;8(1):e1000387.
282. Auditor General. Riksrevisjonens undersøkelse om IKT i sykehus og elektronisk samhandling i helsetjenesten. Document no. 3:7 (2007-2008). Oslo; 2008.
283. Lyse MI. Stopper it-prosjekt til 160 millioner [Terminates 21 million EUR ICT project] [Internet]. *Computerworld.* 2011. Available from: <http://www.idg.no/computerworld/article207882.ece>
284. Selic B. What will it take? A view on adoption of model-based methods in practice. *Softw Syst Model.* 2012 Aug 10;11(4):513-26.
285. Eijden M, Ange HJT, Roost JT, Asman AH. Determinants of Success of Inpatient Clinical Information Systems: A Literature Review. *J Am Med Informatics Assoc.* 2003;10(3):235-43.
286. Rogers EM. Diffusion of innovations. London: The Free Press; 1983.



287. Lyytinen K, Damsgaard J. What's Wrong with the Diffusion of Innovation Theory? *Diffus Softw Prod Process Innov.* 2001;173-90.
288. Fitzpatrick G, Ellingsen G. A Review of 25 Years of CSCW Research in Healthcare: Contributions, Challenges and Future Agendas. *Computer Supported Cooperative Work (CSCW).* 2012.
289. Ashkenas R, Ulrich D, Jick T, Steve K. The boundaryless organization. Breaking the chains of organizational structure. San Francisco: Jossey-Bass. Wiley; 2002.
290. Davenport T. Process innovation: Reengineering work through information technology. Boston: Harvard Business School Press; 1993.
291. Hanseth, Ole; Ciborra C. Risk, Complexity and ICT. Illustrate. Edward Elgar Publishing Ltd; 2007.
292. Greenhalgh T, Potts HWW, Wong G, Bark P, Swinglehurst D. Tensions and paradoxes in electronic patient record research: a systematic literature review using the meta-narrative method. *Milbank Q.* 2009;87(4):729-88.
293. Atkinson P. Work among the Haematologists. In 1995.
294. Schultze U. A Confessional Account of an Ethnography about Knowledge Work. *MIS Q.* 2000 Mar;24(1):3.
295. Mesman J. Disturbing Observations as a Basis for Collaborative Research. *Sci Cult {Lond}.* 2007 Sep;16(3):281-95.
296. Pahl C, Zare M, Nilashi M, de Faria Borges MA, Weingaertner D, Detschew V, et al. Role of OpenEHR as an open source solution for the regional modelling of patient data in obstetrics. *J Biomed Inform. Elsevier Inc.;* 2015;55:174-87.
297. Garde S, Hovenga EJS. Managing Archetypes for Sustainable and Semantically Interoperable Electronic Health Records. *Electron J Heal informatics.* 2007;2(2):1-10.
298. Buck J, Garde S, Kohl CD, Knaup-Gregori P. Towards a comprehensive electronic patient record to support an innovative individual care concept for premature infants using the openEHR approach. *Int J Med Inform.* 2009 Aug;78(8):521-31.
299. Beale T, Heard S. open EHR Release 1.0.2 Architecture Overview. 2008.
300. Johannessen LK, Ellingsen G. Integration and Generification-Agile Software Development in the Healthcare Market. *Comput Support Coop Work.* 2009 Sep;18(5-6):607-34.
301. Berger H. Agile development in a bureaucratic arena-A case study experience. *Int J Inf Manage.* 2007 Dec;27(6):386-96.
302. Klein HK, Myers MD. A Set of Principles for Conducting and Evaluating Interpretive Field Studies in Information Systems. *MIS Q.* 1999 Mar;23(1):67.
303. Walsham G. Interpretive case studies in IS research: nature and method. *Eur J Inf Syst.* 1995 May;4(2):74-81.
304. Berg M, Goorman E. The contextual nature of medical information. *Int J Med Inform.* 1999 Dec;56(1-3):51-60.
305. Silsand L, Ellingsen G. Generification by Translation : Designing Generic Systems in Context of the local. *J Assoc Inf Syst.* 2014;15(April 2014):177-96.



306. Christensen B, Silsand L, Wynn R, Ellingsen G. The Biography of Participation. In: PDC' 14.
307. Star SL, Ruhleder K. Steps Toward an Ecology of Infrastructure : Design and Access for Large Information Spaces. *Inf Syst Res.* 1996;7(1).
308. Callon M, Latour B. Unscrewing the Big Leviathan: how actors macrostructure reality and how sociologists help them to do so. In: *Advances in Social Theory and Methodology: Toward an Integration of Micro- and Macro-Sociologies.* Boston, Mass, Routledge and Kegan Paul; 1981. p. 277-303.
309. Latour B. *Reassembling the Social. An Introduction to Actor-Network-Theory.* Oxford New York: Oxford University Press; 2005.
310. Ellingsen G, Røed K. The Role of Integration in Health-Based Information Infrastructures. *Comput Support Coop Work.* 2010 Sep;19(6):557-84.
311. Grisot M, Vassilakopoulou P. Infrastructures in healthcare: the interplay between generativity and standardization. *Int J Med Inform.* Elsevier Ireland Ltd; 2013 May;82(5):e170-9.
312. Orlikowski WJ, Iacono CS. Research Commentary: Desperately Seeking the "IT" in IT Research-A Call to Theorizing the IT Artifact. *Inf Syst Res.* 2001 Jun;12(2):121-34.
313. Christensen B, Ellingsen G. Evaluating Model-Driven Development for large-scale EHRs through the openEHR approach. *Int J Med Inform.* Elsevier Ireland Ltd; 2016;89:43-54.
314. Ulriksen G-H, Pedersen R, Ellingsen G. Infrastructuring in Healthcare through the OpenEHR Architecture. *Comput Support Coop Work. Computer Supported Cooperative Work (CSCW);* 2017;1-37.
315. Orlikowski, Wanda J. Debra Hofman J. An Improvisational Model for Change Management: The Case of Groupware Technologies. *Sloan Manage Rev.* 1997;38(2):11-21.
316. Ellingsen G, Monteiro E. A patchwork planet integration and cooperation in hospitals. *Comput Support Coop Work (CSCW).* 2003;71-95.
317. Ellingsen G, Monteiro E. The organizing vision of integrated health information systems. *Health Informatics J.* 2008 Sep;14(3):223-36.
318. Ellingsen G, Monteiro E, Røed K. Integration as interdependent workaround. *Int J Med Inform.* Elsevier Ireland Ltd; 2012 Oct;1-9.
319. Ham C. Competition and integration in the English National Health Service. *BMJ.* 2008 Apr 12;336(7648):805-7.
320. Perrow C. *Normal accidents: Living with high-risk technologies.* New York: Basic Books; 1984.
321. Bjørnstad C, Christensen B, Ellingsen G. Medication , integrations and practice. In: 15th European Conference on Computer-Supported Cooperative Work. 2017. p. 1-19.
322. Larsen TJ, Niederman F, Limayem M, Chan J. The role of modelling in achieving information systems success: UML to the rescue? *Inf Syst J.* 2009 Jan;19(1):83-117.
323. Silsand L, Ellingsen G. *Complex Decision-Making in Clinical Practice.* In 2016.
324. Aanestad M, Jensen TB. Building nation-wide information infrastructures in healthcare through modular implementation strategies. *J Strateg Inf Syst.* Elsevier B.V.; 2011 May;20(2):161-76.



325. Grisot M, Hanseth O. Journal of the Association for Information Innovation Of , In , On Infrastructures : Articulating the Role of Architecture in Information Infrastructure Evolution Innovation Of , In , On Infrastructures : Articulating the. 15(4):197-219.
326. Van Maanen J. Ethnography as Work: Some Rules of Engagement. J Manag Stud. 2011 Jan 30;48(1):218-34.
327. Forsythe DE. " It ' s Just a Matter of Common Sense ": Ethnography as Invisible Work. Comput Support Coop Work. 1999;127-45.
328. Pollock N, Williams R. e-Infrastructures: How Do We Know and Understand Them? Strategic Ethnography and the Biography of Artefacts. Comput Support Coop Work. 2010 Nov;19(6):521-56.
329. Hanseth O, Lundberg N. Designing work oriented infrastructures. Comput Support Coop Work. Springer; 2001;10(3):347-372.