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Identifying Where the Values Come from IT-Innovations in Health and Social Care

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ABSTRACT

Studies aimed to capture the effects of IT-innovations in health and social care have shown that there is a gap between expected and factual outcomes. Many decision makers feel the need to articulate an ideal end-state for their organizations. Striking the balance between novelty and believability of such an ideal end-state is often tricky and they become neither satisfied with the ideal nor the visioning. In this study, we explore the contribution of IT-innovations to health and social care. The results showed that coherence between context and IT-innovation is important to capture effects and outcomes. Being coherent rather than visionary contributes to identify where you are, as an organization, and to capture effects and outcomes that "make sense" in the context in question. The paper makes an exposition from the model building, algorithm design to performance analysis and contributes to the academic prosperity in Intelligent Information Management. The knowledge generated is expected to provide input when identifying goals that IT-investments are supposed to achieve.

KEYWORDS

IT-Innovation; Intelligent Information Management; Health and Social Care; Coherence

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References

- [1] J. Schumpeter, "The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest and the Business Cycle," Harvard University Press, Cambridge, 1912 and 1936.
- [2] V. Vimarlund and N. G. Olve, "Using ICT to Transform Elderly Healthcare," Proceedings of the 12th International Symposium on Health Information Management Research, Sheffield, 18-20 July 2007, pp 127-135.
- [3] J. Grimson, W. Grimson and W. Hasselbring, "The SI Challenge in Healthcare," Communications of the ACM, Vol. 43, No. 6, 2000, pp. 49-55. doi: 10.1145/336460.336474
- [4] M. Berg, "Implementing Information Systems in Health Care Organizations: Myths and Challenges," International Journal of Medical Informatics, Vol. 64, No. 2-3, 2001, pp. 143-156. doi: 10.1016/S1386-5056(01)00200-3
- [5] N. G. Olve and V. Vimarlund, "Locating ICT's Benefits in Elderly Care," Medical Informatics and the Internet in Medicine, Vol. 30, No. 4, 2005, pp. 297-308. doi: 10.1080/14639230500429363
- [6] V. Vimarlund, N. G. Olve, I. Scandurra and S. Koch, "Information and Communication Technology (ICT) and Elderly Homecare—The Hudiksvall Case," Health Informatics Journal, Vol. 14, No. 3, 2008, pp. 195-209. doi: 10.1177/1081180X08092830
- [7] B. Rahimi, V. Vimarlund and T. Timpka, "Health Information System Implementation: A Qualitative Meta-Analysis," Journal of Medical Systems, Vol. 33, No. 5, 2009, pp. 359-368. doi: 10.1007/s10916-008-9198-9

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- [8] Scandurra, M. H?gglund and S. Koch, " Specific Demands for Developing ICT Systems for Shared Home Care: A User Centred Approach," *Journal on Information Technology in Healthcare*, Vol. 5, No. 3, 2005, pp. 279- 285.
- [9] Andersson, V. Vimarlund and T. Timpka, " Management Demands on Information and Communication Technology in Process Oriented Healthcare Organizations," *International Journal of Management in Medicine*, Vol. 16, No. 2-3, 2002, pp. 188-198.
- [10] L. Afrin, K. Courtney, G. Demiris, W. Goossen, C. Lovis, C. Lynch, M. Sondhi, S. Speedie and V. Vimarlund, " Patient-Centered Applications and Mobile Health; Use of IT to Promote Disease Management and Wellness," *Journal of the American Medical Informatics Association*, Vol. 15, No. 1, 2008, pp. 8-13.
- [11] M. Lissack and J. Roos, " Be Coherent not Visionary," *Long Range Planning*, Vol. 34, No. 1, 2001, pp. 53-70. doi:10.1016/S0024-6301(00)00093-5
- [12] V. P. Aggelidis and P. D. Chatzoglou, " Methods for Evaluating Hospital Information Systems: A Literature Review," *EuroMed Journal of Business*, Vol. 3, No. 1, 2008, pp. 99-118. doi:10.1108/14502190810873849
- [13] H. Alalwany and S. Alshawi, " Evaluation of E-Health Services: User' s Perspective Criteria," *Transforming Go- vernment: People, Process and Policy*, Vol. 2, No. 4, 2008, pp. 243-255.
- [14] E. Ammenwerth, S. Graber, G. Herrmann, T. Burkle and J. Konig, " Evaluation of Health Information Systems- Problems and Challenges," *International Journal of Medical Informatics*, Vol. 71, No. 2-3, 2003, pp. 125-135. doi:10.1016/S1386-5056(03)00131-X
- [15] E. Ammenwerth, U. Mansmann, C. Iller and R. Eichst?dter, " Factors Affecting and Affected by User Acceptance of Computer-Based Nursing Documentation: Results of a Two-Year Study," *Journal of the American Medical Informatics Association*, Vol. 10, No. 1, 2003, pp. 69-84. doi:10.1197/jamia.M1118
- [16] E. Balka, " Technology, Governance and Patient Safety: Systems Issues in Technology and Patient Safety," *International Journal of Medical Informatics*, Vol. 76, No. 1, 2007, pp. 35-47. doi:10.1016/j.ijmedinf.2006.05.046
- [17] P. A. Bath, " Health Informatics: Current Issues and Challenges," *Journal of Information Science*, Vol. 34, No. 4, 2008, pp. 501-518. doi:10.1177/0165551508092267
- [18] Baum, S. Figar, J. Serverino, D. Assale, B. Schachner, P. Otero, et al., " Assessing the Impact of Change in the Organization of a Technical Support System for a Health Information Systems (HIS)," *Studies in health technology and informatics*, Vol. 107, No. 2, 2004, pp. 1367-1370.
- [19] P. Bonnabry, C. Despont-Gros, D. Grauser, P. Casez, M. Despond, D. Pugin, et al., " A Risk Analysis Method to Evaluate the Impact of a Computerized Provider Order Entry System on Patient Safety," *Journal of the American Medical Information Association*, Vol. 15, No. 4, 2008, pp. 453-460. doi:10.1197/jamia.M2677
- [20] J. Bourbeau, J.-P. Collet, K. Schwartzman, T. Ducruet, D. Nault and C. Bradley, " Economic Benefits of Self-Ma- nagement Education in COPD," *CHEST*, Vol. 130, No. 6, 2006, pp. 1704-1711. doi:10.1378/chest.130.6.1704
- [21] J. Brender, " *Handbook of Evaluation Methods for Health Informatics*," Academic Press, Waltham, 2005.
- [22] Brennan, S. E. Chick and R. Davies, " Taxonomy of Model Structures for Economic Evaluation of Health Technologies," *Health Economics*, Vol. 15, No. 12, 2006, pp. 1295-1310. doi:10.1002/hec.1148
- [23] L. Buccoliero, S. Calciolari and M. Marsilio, " A Methodological and Operative Framework for the Evaluation of an E-Health Project," *International Journal of Health Planning and Management*, Vol. 23, No. 1, 2008, pp. 3- 20. doi:10.1002/hpm.881
- [24] R. Busse, U. Nimptsch and T. Mansky, " Measuring, Monitoring, and Managing Quality in Germany' s Hospitals," *Health Affairs*, Vol. 28, No. 2, 2009, pp. 294-304. doi:10.1377/hlthaff.28.2.w294
- [25] M. J. Buxton, " Economic Evaluation and Decision Making in the UK," *Pharmacoeconomics*, Vol. 24, No. 11, 2006, pp. 1133-1142. doi:10.2165/00019053-200624110-00009

- [26] H. Buysse, G. D. Moor, G. V. Maele, E. Baert, G. Thienpont, and M. Temmerman, "Cost-Effectiveness of Tele-monitoring for High-Risk Pregnant Women," *International Journal of Medical Informatics*, Vol. 77, No. 10, 2008, pp. 641-714.
- [27] L. M. Canady, "Implementing a Home Telemonitoring Program," *Home Healthcare Nurse*, Vol. 26, No. 4, 2008, pp. 231-236. doi:10.1097/01.NHH.0000316701.15010.e1
- [28] B. Chaudhry, J. Wang, S. Wu, M. Maglione, W. Mojica, E. Roth, et al., "Systematic Review: Impact of Health Information Technology on Quality, Efficiency, and Costs of Medical Care," *Annals of Internal Medicine*, Vol. 144, No. 10, 2006, pp. 742-752.
- [29] J. S. Clark, F. S. Mair, C. O' Donnell and J. Liu, "E-Health: Implementation and Evaluation Research in Scotland—A Scoping Exercise," *Journal of Telemedicine and Telecare*, Vol. 3, No. 14, 2008, pp. 119-121.
- [30] D. C. Classen, A. J. Avery and D. W. Bates, "Evaluation and Certification of Computerized Provider Order Entry Systems," *Journal of the American Medical Informatics Association*, Vol. 14, No. 1, 2007, pp. 48-55. doi:10.1197/jamia.M2248
- [31] P. D. Clayton, S. P. Narus, A. Watson, I. Bowes, T. S. Madsen, A. B. Wilcox, G. Orsmond, et al., "Physician Use of Electronic Medical Records: Issues and Successes with Direct Data Entry and Physician Productivity," *AMIA Annual Symposium Proceedings*, Washington, 22- 26 October 2005, pp. 141-145.
- [32] S. S. Cohen, "Emerging Benefits of Integrated IT Systems," *Healthcare Executive*, Vol. 20, No. 5, 2005, pp. 14-18.
- [33] R. E. Connely, "If You Build It, Don't Expect Them to Come," *Health Management Technology*, Vol. 29, No. 8, 2008, pp. 32-33.
- [34] J. Corrigan and D. McNeill, "Building Organizational Capacity: A Cornerstone of Health System Reform," *Health Affairs*, Vol. 28, No. 2, 2009, pp. 205-215. doi:10.1377/hlthaff.28.2.w205
- [35] C. M. Cusack and E. G. Poon, "Evaluation Toolkit Version 3," Agency for Healthcare Research and Quality, Rockville, 2009.
- [36] N. F. de Keizer and E. Ammenwerth, "The Quality of Evidence in Health Informatics: How did the Quality of Healthcare IT Evaluation Publications Develop from 1982 to 2005?" *International Journal of Medical Informatics*, Vol. 77, No. 1, 2008, pp. 41-49. doi:10.1016/j.ijmedinf.2006.11.009
- [37] C. C. Diamond and C. Shirky, "Health Information Technology: A Few Years of Magical Thinking?" *Health Affairs*, Vol. 27, No. 1, 2008, pp. 383-390.
- [38] K. B. Eden, R. Messina, H. Li, P. Osterweil, C. R. Henderson and J. M. Guise, "Examining the Value of Electronic Health Records on Labor and Delivery," *American Journal of Obstet Gynecology*, Vol. 199, No. 3, 2008, pp. 301-309. doi:10.1016/j.ajog.2008.07.004
- [39] Dobrev, et al, Financing eHealth, European Commission, DG INFSO & Media, 2008.
- [40] L. Goldzweig, A. Towfigh, M. Maglione and P. G. Shekelle, "Costs and Benefits of Health Information Technology: New Trends From The Literature," *Health Affairs*, Vol. 28, No. 2, 2009, pp. 282-293. doi:10.1377/hlthaff.28.2.w282
- [41] J. C. Hobson, S. Khemani and A. Singh, "Prospective Audit of the Quality of ENT Emergency Clinic Notes before and after Introduction of a Computerized Template," *Journal of Laryngology & Otolaryngology*, Vol. 119, No. 4, 2005, pp. 264-266. doi:10.1258/0022215054020359
- [42] E. W. Huang and D. M. Liou, "Performance Analysis of a Medical Records Exchange Model," *IEEE Transactions on Information Technology in Biomedicine*, Vol. 11, No. 2, 2007, pp. 153-160. doi:10.1109/TITB.2006.875681
- [43] D. Kaufman, W. D. Roberts, J. Merrill, T. Y. Lai and S. Bakken, "Applying an Evaluation Framework for Health Information System Design, Development, and Implementation," *Nursing Research*, Vol. 55, No. 2, 2006, pp. S37-S42. doi:10.1097/00006199-200603001-00007
- [44] H. Laerum, T. H. Karlsen and A. Faxvaag, "Effects of Scanning and Eliminating Paper-based Medical Records on Hospital Physicians' Clinical Work Practice," *Journal of the American Medical Informatics Association*, Vol. 10, No. 6, 2003, pp. 588-595. doi:10.1197/jamia.M1337
- [45] H. Laerum, T. H. Karlsen and A. Faxvaag, "Use of and Attitudes to a Hospital Information System by

- [46] Likourezos, D. B. Chalfin, D. G. Murphy, B. Sommer, K. Darcy and S. J. Davidson, " Physician and Nurse Satisfaction with an Electronic Medical Record system," *The Journal of emergency medicine*, Vol. 27, No. 4, 2004, pp. 419-424. doi:10.1016/j.jemermed.2004.03.019
- [47] Lockamy III and D. L. Smith, " Telemedicine: A Process Enabler for Enhanced Healthcare Delivery Systems," *Business Process Management Journal*, Vol. 15, No. 1, 2009, pp. 5-19. doi:10.1108/14637150910931433
- [48] J. McLeod Jr., " Measuring Success in Inter-organizational Information Systems: A Case Study," *Communications of AIS*, Vol. 22, 2008, pp. 617-634.
- [49] N. Menachemi and R. G. Brooks, " Reviewing the Benefits and Costs of Electronic Health Records and Associated Patient Safety Technologies," *Journal of Medical Systems*, Vol. 30, No. 3, 2006, pp. 159-168. doi:10.1007/s10916-005-7988-x
- [50] T. Mettler and V. Vimarlund, " Understanding Business Intelligence in the Context of Health Care," *Health Informatics Journal*, Vol. 15, No. 3, 2009, pp. 1-11. doi:10.1177/1460458209337446
- [51] J. B. Metzger, E. Welebob, F. Turisco and D. C. Classen, " The Leapfrog Group' s CPOE Standard and Evaluation Tool," *Patient Safety and Quality Healthcare*, Vol. 78, No. S1, 2008, pp. S69-S76.
- [52] M. Mitka, " Advice on Adopting New Health Care IT Systems," *Journal of the American Medical Association*, Vol. 301, No. 6, 2009, pp. 587-589. doi:10.1001/jama.2009.37
- [53] J. R. Moehr, J. Schaafsma, C. Anglin, S. V. Pantazi, N. A. Grimm and S. Anglin, " Success Factors for Telehealth— A Case Study," *International Journal of Medical Information*, Vol. 75, No. 10-11, 2006, pp. 755-763. doi:10.1016/j.ijmedinf.2005.11.001
- [54] Mukherjee and J. McGinnis, " E-healthcare: An Analysis of Key Themes in Research," *International Journal of Pharmaceutical and Healthcare Marketing*, Vol. 4, No. 1, 2007, pp. 349-363. doi:10.1108/17506120710840170
- [55] K. M?kel?, I. Virjo, J. Aho, P. Kalliola, A.-M. Koivu-koski, H. Kurunm?ki, et al., " Electronic Patient Record Systems and the General Practitioner: An Evaluation Study," *Journal of Telemedicine and Telecare*, Vol. 11, No. 2, 2005, pp. 66-68. doi:10.1258/135763305775124641
- [56] J. C. Niland, L. Rouse and D. C. Stahl, " An Informatics Blueprint for Healthcare Quality Information Systems," *Journal of the American Medical Information Association*, Vol. 13, No. 4, 2006, pp. 402-417. doi:10.1197/jamia.M2050
- [57] H. N?rreklit, " The Balanced Scorecard: What is the Score? A Rhetorical Analysis of the Balanced Scorecard Accounting," *Organizations and Society*, Vol. 28, No. 6, 2003, pp. 591-619. doi:10.1016/S0361-3682(02)00097-1
- [58] Orovigoicoechea, B. Elliott and R. Watson, " Review: Evaluating Information Systems in Nursing," *Journal of Clinical Nursing*, Vol. 17, No. 5, 2008, pp. 567-575.
- [59] P. R. Orszag, " Evidence on the Costs and Benefits of Health Information Technology," *Congressional Budget Office*, Washington, 2008.
- [60] Pagliari, " Design and Evaluation in eHealth: Challenges and Implications for an Interdisciplinary Field," *Journal of Medical Internet Research*, Vol. 9, No. 2, 2007, p. e15. doi:10.2196/jmir.9.2.e15
- [61] Pagliari, M. Gilmour and F. Sullivan, " Electronic Clinical Communications Implementation (ECCI) in Scotland: A Mixed-Methods Programme Evaluation," *Journal of Evaluation in Clinical Practice*, Vol. 10, No. 1, 2004, pp. 11-20. doi:10.1111/j.1365-2753.2004.00475.x
- [62] PHII, " Towards Measuring Value: An Evaluation Framework for Public Health Information Systems," *Public Health Informatics Institute*, Decatur, 2005.
- [63] Protti, T. Bowden and I. Johansen, " Adoption of Information Technology in Primary Care Physician Offices in New Zealand and Denmark, Part 3: Medical Record Environment Comparisons," *Informatics in Primary Care*, Vol. 16, No. 4, 2008, pp. 285-290.
- [64] Rahimi and V. Vimarlund, " Introduction of an Integrated Electronic Prescribing System: The Pharmacies' Staff Dimension," *Proceedings of the 14th International Symposium on Health*

- [65] Rahimi, V. Vimarlund and B Rahimi and V. Vimarlund, " Methods to Evaluate IT-Based Administrative Sys- tems in Healthcare Setting: A Literature Review," *Journal of Medical Systems*, Vol. 31, No. 5, 2007, pp. 397- 432. doi:10.1007/s10916-007-9082-z
- [66] E. J. Raja, R. Mahal and V. B. Masih, " An Exploratory Study to Assess the Computer Knowledge, Attitude and Skill among Nurses in Health care Setting of a Selected Hospital, Ludhiana, Punjab, India," 2004. http://ojni.org/8_1/raja.htm
- [67] P. A. Reynolds, J. Harper, A. M. Jenner and S. Dunne, " Better Informed: An Overview of Health Informatics," *British Dental Journal*, Vol. 204, No. 5, 2008, pp. 259- 264. doi:10.1038/bdj.2008.150
- [68] S. V. Rojas and M.-P. Gagnon, " A Systematic Review of the Key Indicators for Assessing Telehomecare Cost-Ef- fectiveness," *Telemedicine and e-Health*, Vol. 14, No. 9, 2008, pp. 896-904.
- [69] J. K. Rotich, T. J. Hannan, F. E. Smith, J. Bii, W. W. Odero, N. Vu, et al., " Installing and Implementing a Computer-based Patient Record System in Sub-Saharan Africa: The Mosoriot Medical Record System," *Journal of the American Medical Informatics Association*, Vol. 10, No. 4, 2003, pp. 295-303. doi:10.1197/jamia.M1301
- [70] C. M. Ruland and I. H. Ravn, " Usefulness and Effects on Costs and Staff Management of a Nursing Resource Management Information System," *Journal of Nursing Management*, Vol. 11, No.3, 2003, pp. 208-215. doi:10.1046/j.1365-2834.2003.00381.x
- [71] M. J. Sculpher, K. Claxton, M. Drummond and C. McCabe, " Wither Trial-Based Economic Evaluation for Health Care Decision Making?" *Health Economics*, Vol. 15, No. 7, 2006, pp. 677-687. doi:10.1002/hec.1093
- [72] R. Siegel, " Information Rx: Evaluation of a New Informatics Tool for Physicians, Patients, and Libraries," *Information Services & Use*, Vol. 26, No. 1, 2006, pp. 1- 10.
- [73] J. Smyth, " Electronic Health Records and Practice Management Solutions: All-in-One versus Best-of-Breed," *Managed Care Outlook*, Vol. 21, No. 14, 2008, pp. 1-5.
- [74] R. Spicer, " Bytes and Bites' —Using Computerized Clini- cal Records to Improve Patient Safety in General Dental Practice," *Dental Update*, Vol. 35, No. 9, 2008, pp. 614- 661.
- [75] D. Stengel, K. Bauwens, M. Walter, T. K?pfer and A. Ekkernkamp, " Comparison of Handheld Computer-As- sisted and Conventional Paper Chart Documentation of Medical Records: A Randomized, Controlled Trial," *The Journal of Bone and Joint Surgery*, Vol. 86, No. 3, 2004, pp. 553- 560.
- [76] Y. Teerawattananon, S. Russell and M. Mugford, " A Sys- tematic Review of Economic Evaluation Literature in Thailand: Are the Data Good Enough to Be Used by Pol- icy-Makers?" *PharmacoEconomics*, Vol. 25, No. 6, 2007, pp. 467-479. doi:10.2165/00019053-200725060-00003
- [77] M. M. Thalanany, M. Mugford, C. Hibbert, N. J. Cooper, A. Truesdale, S. Robinson, et al., " Methods of Data Collection and Analysis for the Economic Evaluation Alongside a National, Multi-Centre Trial in the UK: Conventional Ventilation or ECMO for Severe Adult Respiratory Failure (CESAR)," *BMC Health Services*, Vol. 8, No. 1, 2008, p. 94. doi:10.1186/1472-6963-8-94
- [78] H. Tjora and G. Scambler, " Square Pegs in Round Holes: Information Systems, Hospitals and the Signifi- cance of Contextual Awareness," *Social Science & Medicine*, Vol. 68, No. 3, 2009, pp. 519- 525. doi:10.1016/j.socscimed.2008.11.005
- [79] Tompkins, A. R. Higgins and G. A. Ritter, " Measuring Outcomes And Efficiency In Medicare Value- Based Purchasing," *Health Affairs*, Vol. 28, No. 2, 2009, pp. 251- 259. doi:10.1377/hlthaff.28.2.w251
- [80] J. Tsai and G. Bond, " A Comparison of Electronic Records to Paper Records in Mental Health Centers," *Inter- national Journal for Quality in Health Care*, Vol. 20, No. 2, 1008, pp. 136-143.
- [81] Wakefield, " Patient Safety Investigations: The Need for Interprofessional Learning," *Learning in Health & Social Care*, Vol. 8, No. 1, 2009, pp. 22-32. doi:10.1111/j.1473-6861.2008.00192.x
- [82] S. J. Wang, B. Middleton, L. A. Prosser, C. G. Bardon, C. D. Spurr, P. J. Carchidi, et al., " A Cost-Benefit Analysis of Electronic Medical Records in Primary Care," *American Journal of Medicine*, Vol. 114, No. 5, 2003, pp. 397- 403. doi:10.1016/S0002-9343(03)00057-3
- [83] W. P. Welch, D. Bazarko, K. Ritten, Y. Burgess, R. Har- mon and L. G. Sandy, " Electronic Health

Records in Four Community Physician Practices: Impact on Quality and Cost of Care," *Journal of the American Medical Information Association*, Vol. 14, No. 3, 2007, pp. 320-328. doi:10.1197/jamia.M2125

[84] Verhoeven, L. V. Gemert-Pijnen, K. Dijkstra, N. Nijland, E. Seydel and M. Steehouder, "The Contribution of Teleconsultation and Videoconferencing to Diabetes Care: A Systematic Literature Review," *Journal of Medical Internet Research*, Vol. 9, No. 5, 2007, p. e37. doi:10.2196/jmir.9.5.e37

[85] M. Whyte, "Computerized versus Handwritten Records," *Pediatric Nursing*, Vol. 17, No. 7, 2005, pp. 15-18.

[86] Wilcox, S. S. Jones, D. A. Dorr, W. Cannon, L. Burns, K. Radican, et al., "Use and Impact of a Computer-Generated Patient Summary Worksheet for Primary Care," *AMIA Annual Symposium Proceedings*, Washington, 22-26 October 2005, pp. 824-828.

[87] Williams and S. A. Boren, "The Role of the Electronic Medical Record (EMR) in Care Delivery Development in Developing Countries: A Systematic Review," *Informatics in Primary Care*, Vol. 16, No. 2, 2008, pp. 139-145.

[88] V. Vimarlund, N. G. Olve, I. Scandurra and S. Koch, "Information and Communication Technology (IT) and Elderly Homecare—The Hudiksvall Case," *Health Informatics Journal*, Vol. 14, No. 3, 2008, pp. 195-209. doi:10.1177/1081180X08092830

[89] V. Vimarlund, "Elderly Health, Homecare and Information Technology (IT) Healthcare IT Management," *Journal of the European Association of Healthcare IT Managers*, Vol. 3, No. 3, 2008, pp. 22-23.

[90] S. C. Voelpel, M. Leibold and R. A. Eckhoff, "The Tyranny of the Balanced Scorecard in the Innovation Economy," *Journal of Intellectual Capital*, Vol. 7, No. 1, 2006, pp. 43-60. doi:10.1108/14691930610639769

[91] K. Yamamoto, S. Matsumoto, H. Tada, K. Yanagihara, S. Teramukai, T. Takemura, et al., "A Data Capture System for Outcomes Studies that Integrates with Electronic Health Records: Development and Potential Uses," *Journal of Medical Systems*, Vol. 32, No. 5, 2008, pp. 423-427. doi:10.1007/s10916-008-9147-7

[92] M. M. Yusof, J. Kuljis, A. Papazafeiropoulou and L. K. Stergioulas, "An Evaluation Framework for Health Information Systems: Human, Organization and Technology-fit Factors (HOT-fit)," *International Journal of Medical Informatics*, Vol. 77, No. 6, 2008, pp. 386-398.

[93] M. M. Yusof, A. Papazafeiropoulou, R. J. Paul and L. K. Stergioulas, "Investigating Evaluation Frameworks for Health Information Systems," *International Journal of Medical Informatics*, Vol. 77, No. 6, 2008, pp. 377-385. doi:10.1016/j.ijmedinf.2007.08.004

[94] S. O. Zandieh, "Challenges to EHR Implementation in Electronic-versus Paper-Based Office Practices," *Journal of General Internal Medicine*, Vol. 23, No. 6, 2008, pp. 755-761. doi:10.1007/s11606-008-0573-5

[95] W. P. Zhang, K. Yamauchi, S. Mizuno, R. Zhang and D. M. Huang, "Analysis of Cost and Assessment of Computerized Patient Record Systems in Japan Based on Questionnaire Survey," *Informatics for Health and Social Care*, Vol. 29, No. 3-4, 2004, pp. 229-238. doi:10.1080/14639230400005990

[96] L. Zurita and C. N?hr, "Patient Opinion—EHR Assessment from the Users Perspective," *Health Technology and Informatics*, Vol. 107, No. 2, 2004, pp. 1333-1336.

[97] J. Meredith, "Electronic Patient Record Evaluation in Community Mental Health," *Inform Prim Care*, Vol. 17, No. 4, 2009, pp. 209-213.

[98] K. Ando, J. Koyama, Y. Abe, T. Sato, M. Shoda, Y. Soga, M. Nobuyoshi, T. Honda, K. Nakao, K. Terata, K. Kadowaki, A. Maeda, S. Ogawa, T. Manaka, N. Hagiwara and K. Doi, "Feasibility Evaluation of a Remote Monitoring System for Implantable Cardiac Devices in Japan," *International Heart Journal*, Vol. 52, No. 1, 2001, pp. 39-43. doi:10.1536/ihj.52.39

[99] P. Breen, K. Murphy, G. Browne, F. Molloy, V. Reid, C. Doherty, N. Delanty, S. Connolly and M. Fitzsimons, "Formative Evaluation of a Telemedicine Model for Delivering Clinical Neurophysiology Services Part II: The Referring Clinician and Patient Perspective," *BMC Medical Informatics and Decision Making*, Vol. 10, 2010, p. 49. doi:10.1186/1472-6947-10-49

[100] T. S. Bergmo, "Economic Evaluation in Telemedicine—Still Room for Improvement," *Journal of Telemedicine and Telecare*, Vol. 16, No. 5, 2010, pp. 229-231. doi:10.1258/jtt.2010.009008

- [101] W. Armstrong, C. Sanders, A. D. Farbstein, G. Z. Wu, S. W. Lin, F. T. Liu and T. S. Nesbitt, " Evaluation and Comparison of Store-and-Forward Tele dermatology Applications," *Telemedicine and e-Health*, Vol. 16, No. 4, 2010, pp. 424-438.
- [102] Wang, " The Role of Cost in Telemedicine Evaluation," *Telemedicine and e-Health*, Vol. 10, No. 5, 2009, pp. 954-955.
- [103] T. S. Bergmo, " Can Economic Evaluation in Telemedicine be Trusted? A Systematic Review of the Literature," *Cost Effectiveness and Resource Allocation*, Vol. 24, No. 7, 2009, pp. 7-18.
- [104] M. Le Goff-Pronost and C. Sicotte, " The Added Value of thorough Economic Evaluation of Telemedicine Networks," *The European Journal of Health Economics*, Vol. 11, No. 1, 2009, pp. 45-55. doi:10.1007/s10198-009-0162-5
- [105] J. B. Smith, S. R. Lacey, A. R. Williams, S. L. Teasley, A. Olney, C. Hunt, K. S. Cox and C. Kemper, " Developing and Testing a Clinical Information System Evaluation Tool: Prioritizing Modifications Through End-User Input," *Journal of Nursing Administration*, Vol. 19, No. 6, 2011, pp. 252-258. doi: 10.1097/NNA.0b013e31821c4634
- [106] C. Fr?jd, C. L. Swenne, C. Rubertsson, L. Gunningberg and B. Wadensten, " Patient Information and Participation still in Need of Improvement: Evaluation of Patients' Perceptions of Quality of Care," *Journal of Nursing Administration*, Vol. 19, No. 2, 2001, pp. 226-236.
- [107] J. M. Palm, T. Dart, I. Dupuis, L. Leneveut and P. Degoulet, " Clinical Information System Post-Adoption Evaluation at the Georges Pompidou University Hospital," *AMIA annual symposium proceedings*, Washington, 13- 17 November 2010, pp. 582-586.
- [108] Lau, M. Price, K. Keshavjee and Q. Health, " From Benefits Evaluation to Clinical Adoption: Making Sense of Health Information System Success in Canada," *ElectronicHealthcare*, Vol. 9, No. 4, 2011, pp. e11-e17.
- [109] J. S. Wu, F. Y. Shih, C. H. Chiu, Y. L. Yeh, J. J. Yan, C. C. King and M. S. Ho, " Evaluation of an Adjustable Epidemiologic Information System," *PLoS One*, Vol. 6, No. 1, 2001, p. e14596. doi: 10.1371/journal.pone.0014596
- [110] E. Ammenwerth, F. Rauchegger, F. Ehlers, B. Hirsch and C. Schaubmayr, " Effect of a Nursing Information System on the Quality of Information Processing in Nursing: An Evaluation Study Using the HIS-Monitor Instrument," *International Journal of Medical Informatics*, Vol. 80, No. 1, 2011, pp. 25-38. doi:10.1016/j.ijmedinf.2010.10.010
- [111] J. Y. Feng, H. Chen and S. M. Zhu, " Development and Clinical Evaluation of an Anesthesia Information management system," *National Medical Journal of China*, Vol. 90, No. 35, 2010, pp 2514-2517.
- [112] Krishnan, B. Nongkynrih, K. Yadav, S. Singh and V. Gupta, " Evaluation of Computerized Health Management Information System for Primary Health Care in Rural India," *BMC Health Services Research*, Vol. 310, No. 10, 2010, p. 41.
- [113] Hypp?nen, P. Doupi, P. H?m?l?inen, J. Komulainen, P. Nyk?nen and R. Suomi, " Towards a National Health Information System Evaluation," *Studies in Health Technology and Informatics*, Vol. 160, 2010, pp. 1216-1220.
- [114] Orovigoicoechea and R. A. Watson, " Quantitative Analysis of the Impact of a Computerised Information System on Nurses' Clinical Practice Using a Realistic Evaluation Framework," *International Journal of Medical Informatics*, Vol. 78, No. 12, 2009, pp. 839-849. doi: 10.1016/j.ijmedinf.2009.08.008
- [115] Hypp?nen, P. Doupi, P. H?m?l?inen, J. Komulainen, P. Nyk?nen and R. Suomi, " Planning for National Health Information System Evaluation," *Studies in Health Technology and Informatics*, Vol. 150, 2009, pp. 972-976.
- [116] S. Sivic, L. Gojkovic and S. Huseinagic, " Evaluation of an Information System Model for Primary Health Care," In: K.-P. Adlassnig, et al., Eds., *Medical Informatics in a United and Healthy Europe*, IOS Press, Amsterdam, 2009, pp. 106-110.
- [117] C. Hou, H. C. Yu, Y. J. Hwang, J. Cheng, R. S. Wu, P. Chang. " The Evaluation of the Nurses' Work Performance after Nursing Information System Implementation in One Medical Center in Taiwan," *Studies in Health Technology and Informatics*, Vol. 146, 2009, p. 708.

- [118] F. Lau, " Extending the Infoway Benefits Evaluation Framework for Health Information Systems," *Studies in Health Technology and Informatics*, Vol. 143, 2009, pp. 406-413.
- [119] Y. Y. Mei, J. Marquard, C. Jacelon and A. L. Defeo, " Designing and Evaluating an Electronic Patient Falls Reporting System: Perspectives for the Implementation of Health Information Technology in Long-Term Residential Care Facilities," *International Journal of Medical Informatics*, 2011. [Epub ahead of print] doi:10.1016/j.ijmedinf.2011.03.008
- [120] E. Cummings and P. Turner, " Patient Self-Management and Chronic Illness: Evaluating Outcomes and Impacts of Information Technology," *Studies in Health Technology and Informatics*, Vol. 143, 2009, pp. 229-234.
- [121] M. Magnus, J. Herwehe, L. Andrews, L. Gibson, N. Daigrepoint, J. M. De Leon, N. E. Hyslop Jr., S. Styron, R. Wilcox, M. Kaiser and M. K. Butler, " Evaluating Health Information Technology: Provider Satisfaction with an HIV-Specific, Electronic Clinical Management and Reporting System," *AIDS Patient Care STDS*, Vol. 23, No. 2, 2009, pp. 85-91. doi:10.1089/apc.2008.0053
- [122] S. Hagens and A. Krose, " Evolution of a National Approach to Evaluating the Benefits of the Electronic Health Record," *Studies in Health Technology and Informatics*, Vol. 143, 2009, pp. 389-394.
- [123] S. Petter and A. Fruhling, " Evaluating the success of an emergency response medical information system," *International Journal of Medical Informatics*, Vol. 80, No. 7, 2011, pp. 480-489. doi:10.1016/j.ijmedinf.2011.03.010
- [124] Masic, D. Ciric, A. Pulja, I. Kulasin and H. Pandza, " Quality Assessment of Medical Education and Use of Information Technology," *Studies in Health Technology and Informatics*, Vol. 150, 2009, pp. 898-902.
- [125] S. Khan, C. D. Maclean and B. Littenberg, " The Effect of the Vermont Diabetes Information System on Inpatient and Emergency Room Use: Results from a Randomized Trial," *Health Outcomes Research in Medicine*, Vol. 1, No. 1, 2010, pp. e61-e66. doi:10.1016/j.ehrm.2010.03.002
- [126] M. Domingo, J. Lupón, B. González, E. Crespo, R. López, A. Ramos, A. Urrutia, G. Pera, J. M. Verdú and A. Bayes-Genis, " Evaluation of a Telemedicine System for Heart Failure Patients: Feasibility, Acceptance Rate, Satisfaction and Changes in Patient Behavior Results from the CARME (Catalan Remote Management Evaluation) Study," *European Journal of Cardiovascular Nursing*, 2011. [Epub ahead of print] doi:10.1016/j.ejcnurse.2011.02.003
- [127] Ando, J. Koyama, Y. Abe, T. Sato, M. Shoda, Y. Soga, M. Nobuyoshi, T. Honda, K. Nakao, K. Terata, K. Kado-waki, A. Maeda, S. Ogawa, T. Manaka, N. Hagiwara and K. Doi, " Feasibility Evaluation of a Remote Monitoring System for Implantable Cardiac Devices in Japan," *International Heart Journal*, Vol. 52, No. 1, 2001, pp. 39- 43.
- [128] P. Breen, K. Murphy, G. Browne, F. Molloy, V. Reid, C. Doherty, N. Delanty, S. Connolly and M. Fitzsimons, " Formative Evaluation of a Telemedicine Model for Delivering Clinical Neurophysiology Services Part II: The Referring Clinician and Patient Perspective," *BMC Medical Informatics and Decision Making*, Vol. 10, 2010, p. 49. doi:10.1186/1472-6947-10-49
- [129] W. Armstrong, C. Sanders, A. D. Farbstein, G. Z. Wu, S. W. Lin, F. T. Liu and T. S. Nesbitt, " Evaluation and Comparison of Store-and-Forward Teledermatology Applications," *Telemedicine and eHealth*, Vol. 16, No. 4, 2010, pp. 424-438.
- [130] M. E. Dávalos, M. T. French, A. E. Burdick, S. C. Simmons and F. Wang, " Economic Evaluation of Telemedicine: Review of the Literature and Research Guidelines for Benefit-Cost Analysis. The Role of Cost in Telemedicine Evaluation," *Telemedicine and eHealth*, Vol. 15, No. 10, 2009, pp. 949-953.
- [131] M. Le Goff-Pronost and C. Sicotte, " The Added Value of thorough Economic Evaluation of Telemedicine Networks," *The European Journal of Health Economics*, Vol. 11, No. 1, 2009, pp. 45-55. doi:10.1007/s10198-009-0162-5
- [132] F. Lesesve and R. Garand, " Evaluation of a Telemedicine System for the Transmission of Morpho/Immunological Data Aiming at the Inclusion of Patients in a Therapeutic Trial," *International Journal of Telemedicine and Applications*, 2009. [Epub ahead of print] doi:10.1155/2009/767145
- [133] J. B. Smith, S. R. Lacey, A. R. Williams, S. L. Teasley, A. Olney, C. Hunt, K. S. Cox and C. Kemper, " Developing and Testing a Clinical Information System Evaluation Tool: Prioritizing Modifications through End-User Input," *Journal of Nursing Administration*, Vol. 6, No. 6, 2011, pp. 252-258.

- [134] C. Fr?jd, C. L. Swenne, C. Rubertsson, L. Gunningberg and B. J. Wadensten, " Patient Information and Participa- tion Still in Need of Improvement: Evaluation of Patients' Perceptions of Quality of Care," *Journal of Nursing Ma- nagement*, Vol. 19, No. 2, 2011, pp. 226-236. doi:10.1111/j.1365-2834.2010.01197.x
- [135] J. M. Palm, T. Dart, I. Dupuis, L. Leneveut and P. Degoulet, " Clinical Information System Post-Adoption Eva- luation at the Georges Pompidou University Hospital," *AMIA annual symposium proceedings*, Washington, 13- 17 November 2010, pp. 582-586.
- [136] J. S. Wu, F. Y. Shih, C. H. Chiu, Y. L. Yeh, J. J. Yan, C. C. King and M. S. Ho, " Evaluation of an Adjustable Epidemiologic Information System," *PLoS One*, Vol. 6, No. 1, 2011, p. e14596. doi:10.1371/journal.pone.0014596
- [137] Krishnan, B. Nongkynrih, K. Yadav, S. Singh and V. Gupta, " Evaluation of Computerized Health Management Information System for Primary Health Care in Rural India," *BMC Health Services Research*, Vol. 10, 2010, p. 310. doi:10.1186/1472-6963-10-310
- [138] S. Hagens and A. Krose, " Evolution of a National Ap- proach to Evaluating the Benefits of the Electronic Health Record," *Studies in Health Technology and Informatics*, Vol. 143, 2009, pp. 389-394.
- [139] S. Petter and A. Fruhling, " Evaluating the Success of an Emergency Response Medical Information System," *International Journal of Medical Informatics*, Vol. 80, No. 7, 2011, pp. 480-489.
- [140] Masic, D. Ciric, A. Pulja, I. Kulasin and H. Pandza, " Quality Assessment of Medical Education and Use of Information Technology," *Studies in Health Technology and Informatics*, Vol. 150, 2009, pp. 898-902.
- [141] S. Khan, C. D. Maclean and B. Littenberg, " The Effect of the Vermont Diabetes Information System on Inpatient and Emergency Room Use: Results from a Randomized Trial," *Health Outcomes Research in Medicine*, Vol. 1, No. 1, 2010, pp. e61-e66. doi:10.1016/j.ehrm.2010.03.002
- [142] E. Brynjolfsson and H. Lorin, " Computing Productivity: Firm Level Evidence," *MIT Sloan Working Paper No. 4210-01*, 2003. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=290325
- [143] V. Vimarlund, T. Timpka and N. Hallberg, " Healthcare Professional' s Demand for Knowledge in Informatics," *International Journal of Medical Informatics*, Vol. 53, No. 2-3, 2003, 1999, pp. 107-114.
- [144] V. Vimarlund, et al., " Identifying Utility of Investments in Large Infrastructures for Health and Social Care," *Research Report*, 2009. (only in Swedish)
- [145] V. Vimarlund, et al., " Capturing Outcomes from Investments in ICT in Health and Social Care. An Analysis Model to Evaluation and Control," *Research Report*, 2011. (Only in Swedish)