

Hospital CEOs Need Health IT Knowledge and Trust in CIOs: Insights from a Qualitative Study

Johannes THYE^{a,1}, Ursula HÜBNER^a, Jan-Patrick WEIß^a, Frank TEUTEBERG^b, Jens HÜSERS^a, Jan-David LIEBE^a and Birgit BABITSCH^c

^a*Health Informatics Research Group, Hochschule Osnabrück, Germany*

^b*Research Group Accounting & Information Systems, University Osnabrück, Germany*

^c*Human Sciences, New Public Health, University Osnabrück, Germany*

Abstract. Background: IT is getting an increasing importance in hospitals. In this context, major IT decisions are often made by CEOs who are not necessarily IT experts. Objectives: Therefore, this study aimed at a) exploring different types of IT decision makers at CEO level, b) identifying hypotheses if trust exists between these different types of CEOs and their CIOs and c) building hypotheses on potential consequences regarding risk taking and innovation. Methods: To this end, 14 qualitative interviews with German hospital CEOs were conducted to explore the research questions. Results: The study revealed three major types: IT savvy CEOs, IT enthusiastic CEOs and IT indifferent CEOs. Depending on these types, their relationship with the CIO varied in terms of trust and common language. In case of IT indifferent CEOs, a potential vicious circle of lack of IT knowledge, missing trust, low willingness to take risks and low innovation power could be identified. Conclusion: In order to break of this circle, CEOs seem to need more IT knowledge and / or greater trust in their CIO.

Keywords. CEO, IT knowledge, IT decision making, CEO-CIO relationship

1. Introduction

IT in hospitals has an increasing impact on administrative and clinical processes [1,2]. Therefore, decision making related to hospital IT investments is a strategic task and a matter of the top management team, to increase hospital success. As has been shown, the following different styles of decision making processes can lead to final IT decisions: supported decisions, shared decisions and corporate decisions [3]. In the first case, the chief executive officer (CEO) makes the final decision after being supported by the chief information officer (CIO)². In the second case, a team embracing the CEO, the CIO and clinicians try to build consensus and share the decision-making responsibilities. Finally, in the last case, the IT decision has been already made at corporate level [3]. Depending on the hospital CEO's IT knowledge and background, a shared IT vision as well as the communication habits between CIO and CEO can affect IT decisions [4,5]. In addition, trust and the relationship between CIO and CEO can have an impact on the process of reaching a final result [5,6]. Across different industries, various CIO leadership profiles were identified: the IT orchestrator, IT mechanic, IT advisor and IT laggard [7]. In

¹ Corresponding Author: Johannes Thye M.A., research fellow, Hochschule Osnabrück, Caprivistraße 30A, 49076 Osnabrück, Germany; E-mail: johannes.thye@hs-osnabrueck.de.

² We use the term CIO for all persons in a leading IT role irrespectively of their position as board member.

addition, two more types of CIOs were found to exist in hospitals: IT managers and system administrators [8]. Also at CEO level, different leadership styles were observed, which embrace the facilitative, participative, result oriented, visionary and adaptive style [9]. Although these styles correspond with a particular way of reaching decisions, some do not give insight into the specific interaction of the CEO and CIO nor do they make assumptions about different decision-making personalities at CEO level. Furthermore, in some cases the categories are not adapted to the health care industry and do not focus on IT decision making. Thus, the question persists, how do CEOs cope with the situation, that they usually have a broad knowledge of many areas but must decide on a highly specialised topic such as hospital IT. This study, therefore, aimed at a) exploring different types of IT decision makers at CEO level, b) identifying hypotheses if trust existed between these different types of CEOs and their CIOs and c) investigating what potential consequences this has on taking risks and innovation capabilities.

2. Methods

In order to answer the research questions, a qualitative study design was chosen since it provides an in-depth understanding of underlying values, mechanism and their complexity. Therefore, semi-structured interviews with hospital CEOs in Germany were conducted.¹ Further reasons for a qualitative approach were: a) to explore the communication patterns instead of confirming existing knowledge, b) to involve the leaders directly and personally, which is difficult to be achieved in quantitative questionnaires, and c) to stimulate further research by developing hypotheses. This strategy is in line with the current methodological literature [10,14]. Experts can provide their specialist knowledge that researchers do not know. Especially semi-structured interviews offer the possibility for the interviewee to come up or consider topics that researchers might not have been taken into account. Therefore, each investigation offers the chance to formulate new questions, theories and suggestions [11]. Also access barriers of high-ranking experts, such as CEOs, like time constraints, a general lack of willingness to provide information or the delegation to personal assistants (who complete the questionnaire) [12], can be overcome and thus an exchange on a personal level be established. Above all these reasons that speak in favour of qualitative methods, they offer the opportunity to get in touch with a group of persons who are hard to reach and to obtain “information between the lines”. In this way, unfiltered information can be collected and freedom to explore specific and possibly unexpected special knowledge can be brought off [12].

Although the literature on our research questions is rather scarce we tried to build on existing knowledge as much as possible. The interview guideline was therefore developed on findings from a literature search about decision making and communication in general. Common databases such as ACM, PubMed, SpringerLink, PSYCINFO were researched. Further literature was identified in a snow ball search. An additional google search was conducted. Keywords like CEO, CIO, CIO-CEO relationship, decision making, health IT and synonyms were used and combined to find relevant studies. The studies found focused on reporting structures, IT decision and roles

¹ Further interview results were published in [3]. The methods description of this contribution focuses therefore only on the relevant issues for answering the research questions of this part of the study.

Table 1. Hospital characteristics

| ownership | hospital size | system affiliation (hospital in a group) | teaching status |
|---------------|--------------------------|---|----------------------------|
| public [n=11] | up to 299 beds [n=3] | yes [n=7] | university hospital [n=1] |
| private [n=3] | 300 to 599 beds [n=7] | no [n=7] | teaching hospital [n=10] |
| | more than 600 beds [n=4] | | no teaching hospital [n=3] |

[4,7,9,15-17], IT governance and strategy [4,7,9,18,19] as well as on CIO relationship [4,5,7,20]. Decision making regarding health IT was only poorly covered.

The following topics were addressed by the interviewer in eight open questions: who decides, relationship and collaboration with the CIO, importance of and attitude towards IT, satisfaction with IT development. The guideline was flexible regarding the inclusion of new aspects or evolving questions. Finally, the interviewees were asked to provide background information about themselves and their institution.

In order to obtain a variety of participants, demographics data were used to select different hospital CEOs (Table 1).

Due to the limited availability of hospital CEOs, this study was based on a convenience sample. Fourteen interviews were conducted during the period from 30th May to 11th October 2016 with CEOs from German hospitals. Twelve CEOs were interviewed face-to-face and two via telephone. The interviews lasted between 30 and 75 minutes. Table 2 shows the participant characteristics.

Data collection was finished at the point of saturation, i.e. when the interview results became redundant [12]. The interviews were recorded and then transcribed with MAXQDA 12. MAXQDA is a software with focus on the analysis of qualitative data and text in general and supports the scientific / content wise evaluation of interviews, texts and media. MAXQDA can be used for qualitative, quantitative and mixed method research. The software enabled the interviews to be transcribed, coded and evaluated in a uniform way. Data analysis was initially conducted using categories from the literature in a deductive manner but was extended during the coding process when new categories were added inductively based on the answers. Examples of categories were decision levels, key indicators for decision making or communication and cooperation. An example of a new category was IT projects, because CEOs explicitly reported about single IT projects. Another one was health information systems, which was included in the interviews after the sixth interview.

Table 2. Participant characteristics

| gender | age | background | position |
|--------------|--------------------------|-----------------|-------------------------|
| female [n=2] | between 32 years and 56 | business [n=14] | managing director [n=9] |
| male [n=12] | years [mean 46, SD 7.26] | medicine [n=1] | business director [n=4] |
| | | nursing [n=4] | procurator [n=1] |

3. Results

Pursuant to the information obtained in the interviews about

- a) the CEOs' IT knowledge and training,
- b) their view on the importance of IT and
- c) their attitudes towards IT,

three major types of personalities were found among those who were in a position to make real decisions.

IT savvy CEOs [n=3]: They had received a formal IT education or had been working in an IT department of a hospital. For example, the CEO previously managed IT projects or work as a kind of internal IT consultant. "I accompanied the IT processes at group level before I started here" as CEO [interview 8]. **IT enthusiastic CEOs** [n=6]: IT enthusiastic CEOs had no formal IT training, but regarded themselves as very open towards and interested in IT and IT staff / CIO. This type of CEO tried to make themselves acquainted with IT and to catch up on new developments. However, they often did not have enough time for doing so. "[...] throughout the entire process of admission, diagnosis, therapy and discharge [...] IT has a very important supporting role [...] without IT, nothing works or at least not much" [interview 14]. **IT indifferent CEOs** [n=3]: Some representatives of this type of CEO had a certain degree of IT knowledge but less knowledge about health IT itself. Health IT played a subordinate role according to their opinion because other topics such as restructuring, corporate finance were regarded as more important or because IT was considered as a mere expense factor. An electronic health record "[...] has been projected for years, but due to a shortage of funds it has never been implemented" [interview 7].

There were another two persons who could not be assigned to any of the three categories because they had no mandate to make global IT decisions and because the strategy was already decided upon. Thus, their IT knowledge and interest was of no importance for any IT decisions.

Based on the CEOs' statements about the CEO-CIO relationship and collaboration, trust turned out to be a crucial element as represented by the following statements "[...] IT is, to a large extent, also a matter of trust in the CIO, because they can tell me anything" [interview 6] and "you need tremendous trust [...] to the IT service provider, no matter if it is an internal or external provider. That's essential. Decisions will build on trust" [interview 5]. This meant that trust in the CIO was required in any case and particularly when the CEO had no or little IT knowledge. Another factor that emerged from the statements was the role of the language and terminology used. "[...] it is also due to the language. The CIO sometimes uses a bit too much IT jargon [...]" [interview 4]. Not using the same language could therefore become a barrier between the CEO and the CIO. "Each professional group and department has its own specific language and of course also the IT department. In order for us to be able to understand each other, we should hire quite a lot of interpreters and since we do not want to afford them, we are trying to speak one language [...] this is a constant process, so that they do not hide themselves behind the technical terminology as a shield" [interview 13].

These two elements, trust and language, were also mirrored by the three types of CEO personalities. **IT savvy CEOs** trusted the information given by their CIOs. The CEOs reported that both spoke the same language. Also, **IT enthusiastic CEOs** confirmed to strongly trust the CIO. These statements expressed an even greater degree of trust than the ones of IT savvy CEOs. The IT enthusiastic CEOs also admitted that trust was necessary because they had less IT knowledge. They also mentioned that the language had to be adjusted, however, they would usually understand each other. **IT indifferent CEOs** implied that trust in the CIO was less often present. Figure 1 shows the combination of IT knowledge identified and the degree of trust determined for the different types of CEOs. The left diagram in Figure 1 represents the results with regard to the existing trust, the right diagram relates to the trust that would be appropriate due to the level of domain IT knowledge and due to differences in the terminology used.

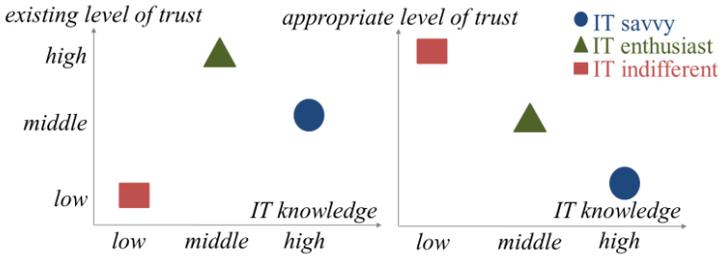


Figure 1. Portfolio matrix of CEO decision makers

IT indifferent CEOs, who had a low level of trust but would need trust in order to make sound IT decisions, were less willing to take a risk. Alike, their innovation capability could be rated lower than that of the other types of CEOs.

4. Discussion

Based on the notion that CEOs are usually the IT decision makers [3], this qualitative study aimed at identifying different types of CEOs. The interviews conducted revealed three major personalities of CEOs: IT savvy CEOs, IT enthusiastic CEOs, and IT indifferent CEOs. In contrast to previous classifications of general leadership styles [9], these types relate to IT, an area of highly specialised knowledge that does not necessarily belong to the competencies of executives. The interviews furthermore underpin the need of trust between CIOs and CEOs as a basis for reliable decisions. The results confirm the finding that CEOs often do not have the necessary IT knowledge, but want someone they can trust in [6,20], which also holds true outside healthcare [5]. A trusted relationship between CEO and CIO can help to place IT topics into the agenda of the top management team [6]. The results also show that CEOs who needed trust in the CIO actually did not have it and vice versa. This circumstance can lead to a vicious circle for IT indifferent CEOs (Figure 2): no IT knowledge is associated with less trust in IT and the CIO, which leads to a rather low willingness to take a risk and less innovative behaviour. As less decisions in favour of IT investments are made, no experience with IT implementations and usage can be gathered. This hypothetical vicious circle needs further research to be corroborated.

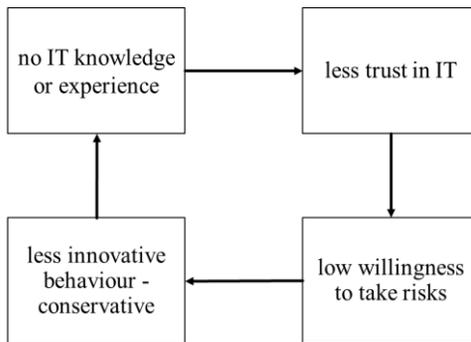


Figure 2: Vicious circle of IT decision making

In order to break of this circle, there seems to be a need to confide in each other [5]. Furthermore, IT knowledge or at least the use of a common language can help to establish a shared understanding [5,20] and to facilitate building trust. Thus, the question arises what IT knowledge, and more generally what, IT core competencies do CEOs need to have and how can they acquire them. Again, this leads to building hypotheses for future work as anticipated and intended by this qualitative study. We thus propose the following hypotheses to be investigated:

- 1) Little knowledge about health IT and low levels of trust in the CIO / IT lead to a self-reinforcing mechanism that keeps institutions from implementing innovative IT (vicious circle hypothesis).
- 2) This hypothetical vicious circle can be interrupted by either increasing the IT competence of CEOs (competence hypothesis) or
- 3) via a common language or terminology (language hypothesis).
- 4) In both cases a trusting relationship between CEO and CIO would result.

We thus can conclude: This study pointed out three potential types of CEOs based on their IT knowledge, experience and attitude towards IT. It also helped identifying a set of hypotheses which demonstrate the importance of investigating issues of trust, IT competencies and language as mediating factors in taking risks and making decisions.

Fourteen study participants are a rather small group, which certainly limits the generalisation of the findings in terms of quantitative research. A further limitation is the focus on hospitals from western and northern Germany. We addressed this problem by interviewing nevertheless at least one CEO from southern and eastern Germany. Political correctness of answers cannot be eliminated, therefore the personal appraisal of the interviewer was noted. Therefore, caution needs to be exercised by interpreting the results. Nevertheless, the international literature partly supports these findings, which indicates that the hypotheses are also valid beyond Germany and potentially also in the healthcare sector. This is underlined by the following two statements: “CEOs without a technical background often don’t know much about IT and therefore want a reliable IT manager they can trust” [5]. “[...] Trust was a key factor underlying the success of personal appeal behaviours. If the CIO had a good track record with [information system] projects and had established a relationship of trust with a peer, then it was likely that the peer would be swayed by personal appeal behaviour [6].”

Still, more research is needed to corroborate the assumptions and test the hypotheses in quantitative studies. Further research should also reflect the view of hospital CIOs to get the entire picture of the relationship and provide insights into reliable structures and processes of sound of IT decision making. Beyond stimulating new research, this study also raised the pragmatic question of how much and what specific IT knowledge do CEOs need to have to decide about complex IT matters.

Acknowledgement

We wish to thank all CEOs for participating in this study. This study was funded by the Ministry of Science and Culture of the State of Lower Saxony (grant: ZN 3062).

References

- [1] G. Kuperman, Reflections on AMIA—looking to the future, *Journal of the American Medical Informatics Association* 20 (2013), e367.
- [2] A. Simon, Die betriebswirtschaftliche Bewertung der IT-Performance im Krankenhaus am Beispiel eines Benchmarking-Projektes, in: H. Schlegel (Ed.), *Steuerung der IT im Klinikmanagement*, Vieweg + Teubner Verlag, Wiesbaden, 2010, pp. 73–90.
- [3] J. Thye, U. Hübner, J. Hüasers, B. Babitsch, IT Decision Making in German Hospitals – Do CEOs Open the Black Box? *Studies in Health Technology and Informatics* 243 (2017), 112–116.
- [4] V. Krotov, Bridging the CIO-CEO gap: It takes two to tango, *Business Horizons* 58 (2015), 275–283.
- [5] A. Hütter, T. Armitz, R. Riedl, Die CIO/CEO-Partnerschaft als Schlüssel zum IT-Erfolg, *HMD Praxis der Wirtschaftsinformatik* 50 (2013), 103–111.
- [6] H.G. Enns, S.L. Huff, C.A. Higgins, CIO Lateral Influence Behaviors: Gaining Peers' Commitment to Strategic Information Systems, *MIS Quarterly* 27 (2003), 155–176.
- [7] D.S. Preston, D.E. Leidner, D.Q. Chen, CIO Leadership Profiles: Implications of CIO Leadership Profiles: Implications of Matching CIO Authority and Leadership Capability on IT Impact, *MIS Quarterly Executive* 7 (2008), 71–83.
- [8] F. Köbler, J. Fähling, H. Krcmar, J.M. Leimeister, IT Governance and Types of IT Decision Makers in German Hospitals, *Business & Information Systems Engineering* 2 (2010), 359–370.
- [9] D. Reeleder, V. Goel, P.A. Singer, D.K. Martin, Leadership and priority setting: the perspective of hospital CEOs, *Health policy (Amsterdam, Netherlands)* 79 (2006), 24–34.
- [10] R.S. Weiss, *Learning from Strangers. The Art and Method of Qualitative Interview Studies.*, The Free Press, New York, 1995.
- [11] J. Gläser, G. Laudel, *Experteninterviews und qualitative Inhaltsanalyse*, VS Verlag für Sozialwissenschaften, Wiesbaden, 2010.
- [12] S. Lamnek, C. Krell, *Qualitative Sozialforschung*, Beltz Verlag, Weinheim, 2016.
- [13] N. King, C. Horrocks, *Interviews in Qualitative Research*, SAGE Publications Ltd, London, 2010.
- [14] J.W. Creswell, *Qualitative inquiry and research design: Choosing among five approaches*, SAGE, Los Angeles, 2013.
- [15] R.B. Banker, N. Hu, P.A. Pavlou, J. Luftman, CIO Reporting Structure, Strategic Positioning and Firm Performance, *MIS Quarterly* 35 (2011), 487–504.
- [16] H. Moghaddasi, A. Sheikhtaheri, CEO is a vision of the future role and position of CIO in healthcare organizations, *Journal of medical systems* 34 (2010), 1121–1128.
- [17] F. Köbler, J. Fähling, J.M. Leimeister, H. Krcmar, How German Hospitals Govern IT - An Empirical Study, *Proceedings of the 17th European Conference on Information Systems (ECIS)*; Verona, Italy (2009), 317.
- [18] P. Weill, J.W. Ross, *IT Governance*, Harvard Business School Press, Boston, 2004.
- [19] A.M. Johnson, A.L. Lederer, IS Strategy and IS Contribution: CEO and CIO Perspectives, *Information Systems Management* 30 (2013), 306–318.
- [20] D.F. Feeny, B.R. Edwards, K.M. Simpson, Understanding the CEO/CIO Relationship, *MIS Quarterly* 16 (1992), 435–448.