

It Needs More Than Just User Participation: Combining Perspectives of Clinical Leaders and Chief Information Officers on Determinants of Hospitals' IT Innovativeness

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Abstract

Although user participation may facilitate the realisation of IT innovations, various literature analyses show only minimal to moderate evidence for such effects possibly due to disregard of mediating factors. Against this background, this study examines the extent to which joint intrapreneurship of clinical leaders and IT leaders as well as a distinct innovation culture mediate the effect of user participation on hospitals' IT innovativeness. IT innovativeness was measured by the availability and usability of IT functions and by the perceived 'innovative power' of a hospital. An empirical model was developed and tested with data from 168 clinical leaders and IT leaders who participated pairwise in a survey representing 84 German hospitals. Three parallel mediation analyses indicated that the participation of users could only lead to IT innovativeness if they were accompanied by intrapreneurial leadership on the part of clinical directors and IT leaders and if a pronounced innovation culture prevailed.

Keywords:

User participation, intrapreneurship, innovation culture, diffusion of innovation, organisational culture

Introduction

Research has repeatedly shown that user participation can facilitate the realisation of IT innovations by blending the technical expertise of the information management department with the system-related functional expertise of users [1]. User participation can refer to various information management activities that take place during IT related innovation processes, ranging from identification of user requirements, implementation and deployment of new applications, to training of colleagues and regular system evaluations [2].

The basic idea behind user participation is to increase the acceptance and motivation of the users and thus contribute to maintaining long-term relationships between the system and its users. In addition to these rather psychological benefits, user participation is expected to generate a number of management-related, methodological and cultural benefits that, taken together, increase an organisations ability to innovate also regarding health IT [3].

Despite this theoretical potential, various literature analyses on the benefits of user participation provide only limited evidence of such effects. Bano and Zowghi [4], for example, conclude in their review of 87 studies that user participation is a double-edged sword which, if not handled properly, can cause more problems than benefits. Frequently cited difficulties that led to misalignments of participatory IT projects included disagreement with project objectives and conflicts about the extent to which users, IT staff and the top management should be empowered to make decisions [4]. Furthermore, He & King [3] showed in a review of 82 studies that the direct effects of

user participation on the successful implementation of IT projects are rather minimal to moderate [2]. One reason for the lack of directly measured effects is seen in the fact that mediation factors are widely ignored. A second reason is seen in the different outcome measures with which the effect of user participation is investigated [2-4].

In hospitals, which often are highly specialised, fragmented expert organisations with complex hierarchies, two determinants in particular may mediate the effect of user participation on the ability to innovate regarding health IT: On the one hand, there is the extent to which clinical leaders and IT leaders jointly value IT innovations and therefore promote and demand user participation (top-down mediation). On the other hand, it is the degree of an innovation friendly organisational culture, which enables change through flexible and agile organisational processes and which is characterised by a clear vision of the future, defining the path for corresponding changes and thus facilitating the realisation of user participation (bottom-up mediation) [5].

Against this background, our study explores the following research questions: (1.) To what extent is the effect of user participation on the hospitals' IT innovativeness mediated by the attitudes of the clinical leaders and IT leaders and (2.) to what extent is the effect mediated by the organisational culture.

In theory, these so called top-down and bottom-up mediators can be described with the concepts of intrapreneurship and innovation culture. Intrapreneurship refers to acting on one's own responsibility on behalf of the organisation or part of the organisation, taking risks and anticipating the impact of one's actions, whereby corresponding initiatives and actions mainly concern the development of new products or the reorganisation and optimisation of existing practices [6]. In hospitals, intrapreneurship among executives is seen as an essential precondition of innovation [7]. Corresponding leadership types are characterised as "boundary spanners", constantly looking for innovative optimisation approaches within the hospital (across professional boundaries) and outside the hospital incorporating these approaches into their strategic actions [5,8]. At the same time, intrapreneurial leaders, especially in medium-sized and larger organisations such as hospitals, cannot drive innovative optimisations on their own. They rather rely on interdisciplinary teams that can work together in a purposeful manner to implement innovative concepts [7]. Against this background, it can be assumed that clinical leaders and IT leaders with strong intrapreneurship personalities encourage their employees to work together closely, constructively and therefore innovatively. Thus, we posit:

H1. *The more pronounced intrapreneurship is at the level of clinical leaders and IT leaders the more likely is a positive effect of user on a hospital's ability to innovate in health IT.*

Innovation culture can be defined as the extent to which an organisation's values and norms focus on the steady

introduction of new and improved practices and products [8]. Hence, a distinctive innovation culture is characterised by the fact that corresponding optimisation approaches are facilitated by a versatile organisational environment and that they are at the same time guided by an organisation-wide vision of the hospital's future [5]. Previous research suggests that organisational culture in hospitals also has a strong influence on the degree to which IT innovations are disseminated [9]. On the basis of prior studies, that already touched on the association between innovation culture and user participation [10], it is assumed that the nature of the organisational culture (innovation-oriented or not) also determines the direction of user participation (innovation-oriented or not). Thus, we posit:

H2. *The more pronounced the innovation culture of a hospital is, the more likely it is that user participation will have a positive effect on a hospital's ability to innovate in health IT.*

Figure 1 displays the research model in which the indirect effects of user participation on the IT innovativeness of a hospital are to be tested. It is assumed that joint intrapreneurship and innovation culture interact in parallel. In order to verify the indirect effect of these mediators, a total of three outcome variables were tested, which together characterise the different facets of IT innovativeness of a hospital. These were a) the availability of a selected set of IT functions, b) the usability of these IT functions and c) the perceived IT related innovation power. The hypothesis H1 is represented by the indirect paths a_1 and b_1 (top-down mediation). Complementarily, hypothesis H2 is represented by the indirect paths a_2 and b_2 (bottom-up mediation). The mediated, direct effect of user participation on innovation power is represented by the path c' .

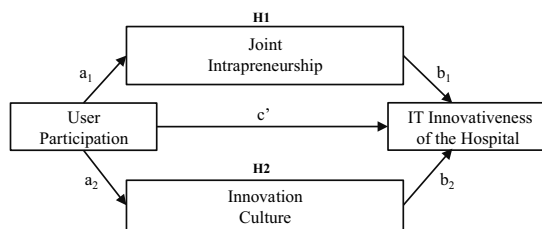


Figure 1 – Research model

Method

The research model was tested with data from 84 German hospitals. One clinical leader and one IT leader of each hospital took part jointly in a survey conducted by the IT Report Healthcare [11]. The IT Report Healthcare consists of a series of surveys that regularly invites IT stakeholders and other key players in all German hospitals to answer questions on topics such as IT maturity and information management.

To test the research model, we conducted three parallel multiple mediator analyses. Parallel mediation analysis allows the simultaneous testing for more than one mediator while accounting for the shared association between them. Model 1 examined the mediating effect of joint intrapreneurship and innovation culture on IT-related innovation power. Model 2 assessed the same mediating effects on the availability of IT functions and Model 3 gauged the mediating effects on the usability of these IT functions.

User participation was measured by asking the clinical leaders to assess the extent to which clinical staff (e.g. physicians / nurses) were involved in IT issues in the hospital on a scale ranging from 1 = "no participation at all" to 10 = intensive participation". The user participation scale comprised seven items that refer to different activities along a typical IT related

innovation process in hospitals (starting with participation in IT strategy development, requirements analysis and system selection followed by user training and system evaluation).

Joint intrapreneurship was assessed by both, the clinical leader and the IT leader with regard to three aspects: (1.) to what extent they regularly take the time to think about IT-supported optimisations of hospital operations, (2.) to what extent they regularly exchange information about new IT solutions with external parties (e.g. suppliers, other IT managers, researchers), and (3.) to what extent they stimulate IT-related innovation. In a fourth item, the clinical leaders were asked to assess the extent to which they regularly seek talks with the IT leader in order to discuss strategic IT issues. Correspondingly, the IT leaders were asked to what extent they seek regular talks on strategic IT issues with clinical leaders. The rating was made on a five-point Likert scale ranging from 1 = "do not agree at all" to 5 = "totally agree".

Innovation culture was also measured by a combined assessment of IT leaders and clinical leaders. Two items were identical in their wording and assessed (1.) the degree to which the hospital, in the participants' opinion, was agile and flexible when it came to the use of new IT solutions and (2.) the extent to which the hospital had a vision of the future that explicitly included the use of IT. In a third item, clinical leaders should assess the scope to which the IT department was visible in their hospital. In a complementary manner, the IT leaders should rate the degree to which they regularly exchange information with clinical departments. The rating was made on a five-point Likert Scale ranging from 1 = "do not agree at all" to 5 = "totally agree".

Availability of IT functions was assessed solely by the IT leaders. The scale covered eight IT functions in four functional classes that primarily cover advanced IT functions: clinical decision support functions (i.e. medication therapy, alerting, clinical reminders), functions that address patient safety (i.e. electronic tracking of medication loop from ordering to administration), decision support functions (i.e. access to clinical databases) and clinical documentation functions (i.e. discharge letter, electronic nursing records, electronic ICU records). The availability was calculated on a five-point Likert scale ranging from 1 = "No, the IT function does not yet exist and an implementation is not planned" to 5 = "The IT function is completely implemented in all units".

Usability of the IT functions was assessed by the clinical leaders: They were asked to rate how well each of the eight abovementioned functions supported the corresponding documentation tasks and clinical processes. The rating was based on a 10-point Likert scale ranging from 1 = "not satisfied at all" to 10 = "completely satisfied".

Finally, IT-related innovative power was measured by a combined assessment of the clinical leaders and the IT leaders. Therefore, the participants of both groups evaluated how innovative they generally considered the hospital to be in terms of the use of IT on a scale from 1 = "not at all innovative" to 10 = "very innovative". The scales used had already been validated in other studies [9-12]. However, since the answers from two groups were combined for three of the six main variables (joint intrapreneurship, innovation culture and innovation power) and since the item sets deviated slightly from the original scales, we recalculated Cronbach's α to check their internal consistency.

We used PROCESS Version 3.1 for the calculations of the mediation models which utilises an ordinary least squares based path-analytical framework to test for both direct and indirect effects [13]. Since PROCESS does not allow testing the statistical assumptions of the data (i.e. linearity, homoscedasticity, normality of the estimation error and

multicollinearity), we additionally calculated eleven simple regression models (one for each path in the three mediation models) and three multiple regression models (taking into account all main variables in the three mediation models). Based on these calculations, we furthermore tested the basic requirements for mediation modelling following Baron and Kenny [14]. According to this test procedure, four criteria must be met to determine mediation effects. The first condition is that there is a significant influence of the independent variable on the dependent variable (path c', see Fig. 1). The second condition is that there is a significant influence of the independent variable on the mediator(s) (path a₁ and a₂). The third condition is that there is a significant influence of the mediator(s) on the dependent variable, taking into account the independent variable (path b₁ and b₂). The final condition is that, taking into account the mediator(s), the effect of the independent variable on the dependent variable (path c') disappears or at least decreases.

After testing all model assumptions and the basic requirements for mediation modelling, we calculated the three mediation models with PROCESS. Statistical significance of indirect effects was assessed using bootstrapped bias-corrected percentile based confidence intervals, based on 10.000 bootstrap samples as recommended by Hayes [13]. Lastly, we calculated 95% confidence intervals for the indirect and total regression coefficients and for the differences between the indirect effects.

Results

Table 1 shows the mean values, standard deviations and Cronbach's α of the six main variables (all values were scaled to range between 1 and 10 to improve comparability) as well as their intercorrelations. Cronbach's α indicated a satisfactory internal consistency for all scales, whereby the value for innovation power was slightly below .6 and was therefore marginally acceptable.

Table 1 – Descriptive statistics, α and intercorrelations (*p < .01)
 UP - user participation, JIP - joint intrapreneurship, IC - innovation culture, IP - innovation power, AIF - availability of IT functions, UIF - usability of IT functions

| | \bar{x} | σ_x | α | 1 | 2 | 3 | 4 | 5 |
|------|-----------|------------|----------|------|------|------|------|------|
| 1UP | 6.2 | 1.6 | .92 | | | | | |
| 2JIP | 7.3 | 1.2 | .82 | .57* | | | | |
| 3IC | 7.1 | 1.4 | .79 | .49* | .60* | | | |
| 4IP | 6.4 | 1.8 | .59 | .43* | .59* | .72* | | |
| 5AIF | 7.7 | 1.5 | .76 | .33* | .54* | .53* | .60* | |
| 6UIF | 7.2 | 1.8 | .87 | .34* | .48* | .28* | .36* | .26* |

The examination of the model assumptions showed that the relationship of the independent and dependent variables could be regarded as linear in all regression models and thus also in the indirect paths. Estimation errors were distributed relatively evenly over the predicted Y-values in all models and thus no heteroscedasticity was found. Q-Q plots yielded that the estimation errors of the calculated models were normally distributed. The calculated VIF values were all below 2.0, indicating no multicollinearity. On the basis of the four test criteria according to Baron and Kenny [16], it could be assumed that the basic requirements for mediation modelling were met.

The results of the three parallel mediation analyses together generally confirmed the hypothesized model. In all models the effect of user participation was mediated by joint intrapreneurship and in two models additionally mediated by the innovation culture. The direct effect of the user participation

on the dependent variables (path c') disappeared in all models, indicating complete mediations. Together, user participation, joint intrapreneurship and innovation culture were able to explain 53.5 % of the variance of innovation power and 33.6 % of the variance of the availability of IT functions. Explained variance of the usability of IT functions amounted to 21.1%. Figure 2 shows the standardised regression coefficients for the relationship between user participation and IT-related innovation power, as it was mediated by joint intrapreneurship and innovation culture with the corrected R² displayed at the top right. The standardised regression coefficient between user participation and IT-related innovation power, controlling for the two mediators, is presented in parentheses. As the model demonstrates, user participation was significantly associated with joint intrapreneurship (a₁), and a high degree of joint intrapreneurship was significantly associated with a higher IT-related innovation power (b₁). The standardised indirect effect mediated by joint intrapreneurship (a₁b₁) was (.57)(.25) = .14 (see also indirect effects Tab. 2). Figure 2 furthermore shows that user participation was also significantly associated with innovation culture (a₂), and a high degree of innovation culture was significantly associated with a higher IT-related innovation power (b₂). The standardised indirect effect mediated via innovation culture (a₂b₂) was (.49)(.56) = .27 (Tab. 2). Figures 3 and 4 can be read in the same way by presenting the standardised regression coefficients for the direct and indirect effects of user participation on the availability respectively the usability of IT functions.

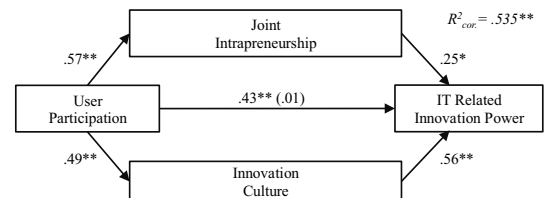


Figure 2 – Mediation model 1 (*p < .05, **p < .01)

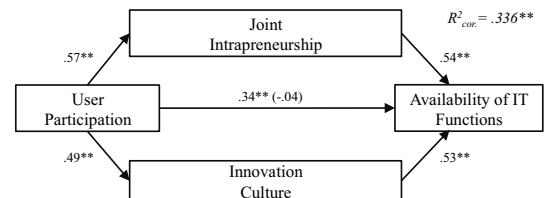


Figure 3 – Mediation model 2 (**p < .01)

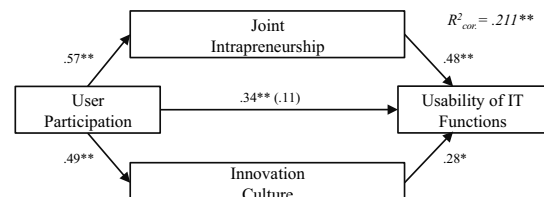


Figure 4 – Mediation model 3 (**p < .01)

Table 2 presents the total and indirect effects of user participation on the IT-related innovation power, availability of IT functions and usability of IT functions. In addition, the 95% bias-corrected confidence intervals based on 10.000 bootstrap samples are displayed. The lower bound of the 95% confidence interval (LCI) via joint intrapreneurship was above zero in all models and therefore significant. The same was true for the

indirect effect via innovation culture in models 1 and 2. The difference between the coefficients was not significant in all models (LCI to UCI) in Model 1: -.41 to .06; LCI to UCI in Model 2: -.16 to .23.

Table 2– Total and indirect effects with bias corrected 95% confidence intervals (CI) from bootstrapping. UP - user participation, JIP - joint intrapreneurship, IC - innovation culture, IP - innovation power, AIF - availability of IT functions, UIF - usability of IT functions

| Path | Coefficient | 95% CI | |
|-------------------------|-------------|--------|-------|
| | | Lower | Upper |
| Total effects | | | |
| UP → IP | .43 | .31 | .70 |
| UP → AIF | .53 | .21 | .53 |
| UP → UIF | .52 | .08 | .45 |
| Indirect Effects | | | |
| UP → JIP → IP | .14 | .02 | .32 |
| UP → IC → IP | .27 | .19 | .50 |
| UP → JIP → AIF | .31 | .06 | .35 |
| UP → IC → AIF | .26 | .06 | .27 |
| UP → JIP → UIF | .27 | .13 | .46 |
| UP → IC → UIF | .14 | -.16 | .13 |

Discussion

With the increasing potential of information technologies to meet the general challenges of efficient and safe health care delivery, the importance of management practices that make IT adoption processes in hospitals smoother and sustainable increases as well. Against this background, user participation is regarded as a promising imperative in information management. Despite this, only moderate empirical evidence of corresponding effects have been provided to date [2-4].

In order to explain the discrepancy between expected and actually proven effects, various mediation factors are discussed in the literature. These range from the complexity and scope of the workflows at hand and the number of IT stakeholders involved in the change process to the complexity of the technology itself and the competencies and attitudes of the users [3]. In addition, some studies point to a mediating effect of leadership behaviour and organisational culture [2-4]. For the hospital environment, in which the latter aspects could be of particular importance due to partially inflexible hierarchies and fragmented organisational structures [5,8], these mediator effects on user participation have not yet been tested on a broad empirical basis.

The present study is a first approach to close this knowledge gap by investigating the mediating effect of intrapreneurial leadership and innovation culture on hospitals' IT innovativeness. The chosen study design had two major advantages: on the one hand, it combined the perspective of clinical leaders and IT leaders, so that the multi-professional character of user participation was taken into account. On the other hand, the assumed mediation effects are examined not only in relation to one, but to three outcome variables. This made possible to test whether the mediation effects considered occur independently of the chosen outcome variable.

The results of the mediation analysis confirmed the hypothesis model. It could be shown that there is less of a direct effect of user participation on the IT innovativeness of hospitals, but that this effect mainly occurs when clinical leaders and IT leaders have a strong intrapreneurship personality and when a distinct innovation culture prevails. It could also be shown that the

indirect effects explain up to half of the variance of IT innovation, depending on how it is operationalised.

In order to further explain the critical role of intrapreneurial leadership, the findings can be linked to the results of previous studies and existing leadership theories. Two aspects seem to be particularly important. The first one concerns the connection between intrapreneurship and transformative leadership. The results indicate that intrapreneurial leaders are able to achieve a high degree of IT innovativeness on their own by regularly and proactively thinking about optimisation possibilities and searching for suitable ideas inside and outside the organisation. At the same time, intrapreneurial leaders seem to have the ability to transfer this intrapreneurial thinking and acting to their employees. Corresponding indications are already given by Lega [7], who argues that intrapreneurial leaders must have a team behind them in order to implement their innovative approaches. This mechanism of an interpreneurial feedback loop from the leadership level to the employees can be explained by the concept of transformative leadership. Transformative leaders are characterised by the desire to intrinsically motivate their employees. They therefore provide promising visions of the future, offer suitable ways to achieve corresponding goals, act as role models and promote individual employee developments [15]. As such, they are able to forge alliances and propel a sense of communal spirit so that creative momentum from user participation can be transformed for the good of the organisation.

The second important aspect that emerges from the results relates to the joint appearance of intrapreneurship at the leadership level. Since the operationalization of joint intrapreneurship was designed in such a way that high values can only be achieved if both the clinical leader and the IT leader have a pronounced intrapreneurship personality, it can be assumed that positive effects of user participation occur to a lower degree if only one of the two leaders thinks and acts intrapreneurially. Conversely, this also means that participation should not take place at the user level alone if innovations are to be successfully implemented. Rather, participation must reach into the management level, where clinical leaders seek exchange with IT leaders and vice versa. These findings go hand in hand with previous studies that examined the effectiveness of hospital CIOs and concluded that a close connection to the hospital board goes hand in hand with IT performance and IT innovation [5]. Above all, however, the results regarding intrapreneurship highlight the decisive role that clinical leaders can play for the implementation of IT innovations. They act as agents and representatives of the users and close the gap to IT. To put it simply: If clinical leaders are removed from the equation, the greatest organisational efforts, including user participation, will not lead to successful IT innovations [7].

In order to interpret the demonstrated indirect effect of innovation culture, a closer look at the way in which user participation was captured appears to be helpful. The user participation scale measures the extent to which clinical users are involved in information management tasks, which in turn relate to a typical IT innovation process in an organisation - ranging from the identification and selection of new IT solutions to the participation in implementation projects and the conduct of user training and evaluation studies. The results of this study now indicate that these tasks can be carried out more effectively if they are supported by agile and flexible organisational structures. This finding is largely consistent with previous studies which have identified a low level of bureaucracy, low and permeable hierarchies and a low level of formalisation as basic prerequisites for innovative employee activities [8]. The great importance of a common vision of the

future for innovative employee activities has also been identified in other studies [16]. Last but not least, user participation seems to unfold positive effects on the hospital's innovativeness, if it is accompanied by a strong motivation for interprofessional exchange on the part of the clinical units and the IT department.

Finally, the results indicate that the effect size of joint intrapreneurship and innovation culture does not substantially differ. At the same time, the indirect effect of user participation via innovation culture was significant in only two of the three models. Taken together, it can therefore be concluded that without the observed top-down and bottom-up mediators, user participation will have little effect.

The present study has some limitations which also point to further research needs. Although the sample size can be considered sufficiently big taking into account the calculated regression coefficients [17], the examined effects should be retested in order to validate our results. Here, moderating factors such as hospital size or ownership could also be factored in. These characteristics are regarded as structural determinants of the hospital's IT innovativeness, but were not taken into account in the analyses due to the small group sizes of the individual characteristics. As the results suggest that transformational leadership may be the missing link between intrapreneurial leaders and user participation, this could be explicitly tested in future research. In the present study only the joint impact of intrapreneurship was considered, as it was assumed that both groups involved in participation (users and IT) need leadership. The study primarily used quantitative methods to answer the research questions, therefore the results should be further elaborated through a qualitative approach. Finally, the results demonstrate that joint intrapreneurship and innovation culture correlate. Even if no multicollinearity was found in the mediation models, this correlation could be investigated more closely. An innovative culture could, for example, promote the rise of intrapreneurial leaders, who would then be able to lead parts of the organisation to faster change.

Conclusions

This study investigated to what extent joint intrapreneurship and innovation culture mediate the effect of user participation on the IT innovativeness of hospitals. The results indicate that these so-called top-down and bottom-up mediators are not only sufficient but necessary conditions for successful user participation. In summary, the findings consolidate the network of possible preconditions for the hospital's IT innovativeness and - perhaps even more interestingly - contributes to the order of these preconditions.

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References

- [1] N. Saleem, D. Steel, G. Gercek and A. Chandra, Significance of User Participation in a Hospital Information System Success: Insights From a Case Study. *Health Care Manag* **36**(2)(2017), 199–205.
- [2] U. Abelein and B. Paech, Understanding the Influence of User Participation and Involvement on System Success - A Systematic Mapping Study, *Emp Softw Engin*, **20**(1) (2015), 28-81.

- [3] J. He and W.R. King, The role of user participation in Information systems development: implications from a meta-analysis", *J of Manag Inf Sy*, **25** (1) (2008), 301–331.
- [4] M. Bano and D. Zowghi. A systematic review on the relationship between user involvement and system success. *Inform and Softw Techn* **58** (2015) 148–169.
- [5] K. Cresswell and A. Sheikh, Organizational issues in the implementation and adoption of health information technology innovations: An interpretative review *Int J Med Inform* **82**(5) (2013) e73-86.
- [6] B. Antoncic and R.D. Hisrich, Clarifying the intrapreneurship concept. *J Sm Bus Enterp Dev*, **10** (1) (2003), 7-24.
- [7] F. Lega, Strategic, organizational and managerial issues related to innovation, entrepreneurship and entrepreneurship in the hospital context: remarks from the Italian experience. *J Manag & Marke Healthcare* **2**(1) (2009) 77-93.
- [8] T. Greenhalgh, G. Robert, F. MacFarlane, P. Bate and O. Kyriakidou, Diffusion of innovations in service organizations: Systematic review and recommendations. *Milbank Quarterly*. **2**(4) (2004), 581–629.
- [9] M. Esdar, J.D. Liebe, J.P. Weiß and U. Hübner. Exploring Innovation Capabilities of Hospital CIOs: An Empirical Assessment. *Stud Health Techn Inform* **235** (2017), 383-7.
- [10] M. Esdar, J.D. Liebe, B. Babitsch and U. Hübner, Determinants of Clinical Information Logistics: Tracing Socio-Organisational Factors and Country Differences from the Perspective of Clinical Directors. *Stud Health Techn Inform* **253** (2018), 143-147.
- [11] IT-Report Healthcare [homepage on the Internet, cited 2018 Nov 25]. Available from: <https://www.hs-osnabrueck.de/de/it-report-gesundheitswesen/publikationen/>
- [12] J. Hüßers, U. Hübner, M. Esdar, E. Ammenwerth, W.O. Hackl, L. Naumann and J.D. Liebe, Innovative Power of Health Care Organisations Affects IT Adoption: A bi-National Health IT Benchmark Comparing Austria and Germany. *J Med Syst* **41** (2017), 33.
- [13] Hayes, A. F. (2013). An introduction to mediation, moderation, and conditional process analysis: A regression-based approach. New York, NY: Guilford Press.
- [14] R.M Baron and D.A. Kenny, The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *J Pers Soc Psychol* **51** (1986), 1173-1182.
- [15] N.K. Jaiswal, L.D. Rajib, Transformational leadership, innovation climate, creative self-efficacy and employee creativity: A multilevel study. *Int J of Hosp Manag* **51** (2015), 30-41.
- [16] D.E. Leidner, D. Preston, D. Chen. An examination of the antecedents and consequences of organizational IT innovation in hospitals. *J Strateg. Inf. Syst.* **19** (2010), 154–70.
- [17] M.S. Fritz and D.P. MacKinnon. Required sample size to detect the mediated effect. *Psychol Sci* **18** (2007) 233-239.

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