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Perceived risk and the need for trust as drivers of improved surgical skills in 3D surgical video technology

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ABSTRACT

Based on the technology adoption model, the implementation of medical technology presents a double-edged sword. On the one hand, it may improve health outcomes and facilitate improved skills; on the other hand, it could elicit risk and trust concerns. In this exploratory study, which combines adoption of the medical technology with an associated skills improvement framework, we use responses from eighty-five staff members directly involved in the peri- and intra-operative care of the patient at a large hospital in Sweden during the gestating stages of 3D surgical video implementation. We find that a perceived lower risk for patients from 3D surgical videos is positively associated with improved surgical skills through a lower perceived need for trust in 3D surgical videos. The findings show that lower perceived losses lead to lower need for trust, which, in turn, improves perceptions of improved surgical skills. The findings carry implications for considering non-technological and non-medical factors in driving appreciation of the benefits (perceived improvements in surgical skills).

Introduction

Medical innovation is increasingly center stage in technological advancement (Culnan & Armstrong, 1999; Price & Cohen, 2019; Torous & Roberts, 2017). With improvements in technology, a variety of technological innovations – pharmacological and informational – have been at the forefront of the innovation frontier. However, as the full range of benefits are pursued from such innovations, there are growing concerns over privacy and trust among patients (Hutchings, Loomes, Butow, & Boyle, 2020). With product recalls and faster pharmacological approval pipelines, there are increasing concerns among patients on trust and risk issues in the face of rapid strides in medical innovation. At the same time, the usage of such technology could improve the skills of medical providers over time (Haluck & Krummel, 2000; Konge & Lonn, 2016; Porte, Xeroulis, Reznick, & Dubrowski, 2007; Tendick et al., 2000).

In this exploratory research note, we explore the adoption concerns of 3D surgical videos. These 3D surgical videos – an emerging technology – have a variety of applications, including allowing surgeons to revisit the video so that they can not only improve their skills but also re-evaluate the care given to the patient during the post-operative follow-up. The technology reduces concerns over malpractice. Due to the existence of universal healthcare in Sweden – the country of our study – we expect such cases to be quite rare. We foresee potential gains in improved surgical skills as the likely consequence of the innovation. The focus of our study is on the prospect of a win-win solution for patients and surgeons. Giving consideration to 3D surgical videos in the current hospital was in the very early stages of enactment. Consequently, associated concerns and trust-related issues had to be worked through in tandem with the stakeholders. Thus, 3D surgical videos have the potential to provide the functionality and efficiency needed to improve operating accuracy. Nevertheless, concerns remain among patients on the issues of safety, riskiness, and trust.

We draw on the technology adoption model (TAM) to assess the role of lower perceived risk in driving lower need for trust in the technology, leading to improvements in surgical skills (Dixon, 1999; Irani, Ahmad, Amer, Qutaifan, & Alhilali, 2013; Oyetade, Zuva, & Harmse, 2020; Tsai, Hung, Yu, Chen, & Yen, 2019). Trust and risk considerations are center stage in the theoretical discourse on TAM, and the proposed approach aims to develop a deeper understanding of how medical information innovation in the form of 3D surgical videos can help improve healthcare. We focused on data from operating

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room staff – individuals who do not have a direct stake as either patients or surgeons but are better placed to empathize with patient concerns whilst being fully aware of surgical procedures. Our research question focuses on whether lower perceived riskiness is associated with the perception of a lower need for trust, which may, in turn, improve perceived surgical skills. Therefore, lower perceived risk can garner a lower need for trust, leading to a higher perception of improved surgical skills among operating room staff.

Theoretical background

Technology acceptance model (TAM), trust, and risk

To test for the phenomenological nature of patient concerns and expected improvements in surgical skills, we draw on the technology acceptance model (TAM) – a theory on how users understand, adopt, and accept technology. TAM focuses on the beliefs and attitudes that drive intentions to adopt. This model proposes that perceived usefulness and perceived ease of use drive the intention to use. TAM is widely used in understanding technology adoption and has been used in a variety of technology adoption contexts (Davis, Bagozzi, & Warshaw, 1989; Davis & Venkatesh, 1996; Venkatesh & Davis, 2000).

The 3D surgical video technology offers improved medical benefits to both the surgeon and the patients. Yet, the sociotechnical elements of technology acceptance are important considerations in explaining voluntary acceptance of the technology (Gücin & Berk, 2015; Holden & Karsh, 2010). Researchers have applied the technology acceptance model to a range of contexts to understand the relevance of contextual elements in elucidating TAM and the role of stakeholders in explaining social and psychological elements of technology acceptance (Bagozzi, 2007). User concerns related to the design and use of technology are important (Davis, 1985), with perceived usefulness and perceived ease of use central to design considerations (Szajna, 1996). In the current context, perceived usefulness is the mainstay of our theoretical development, given that the perceived ease of use is not pertinent to patients.

In the context of 3D surgical video recording technology, the dual considerations are improvements in surgical skills and trust and potential risk concerns. On the one hand, the recording of surgical videos increases value propositions for surgeons and patients. Surgeons can revisit the videos months after the surgery to assist recall, and the videos can be used for training and educational purposes. The presence of video as a documentation record also increases accountability and lowers the risk of malfeasance. Patients can take the video to other medical practitioners (e.g., traveling to a foreign country or changing service providers) to share details of the surgery. Utilization of the videos is not only driven by technological feasibility but also intertwined with social influences and perceptions.

On the other hand, patients may perceive increased risks and have privacy concerns, generating anxiety and resistance to the technology. The concerns are twofold. Surgeons may perceive the process of recording as an indicator of lack of trust, and monitoring by video could make them risk averse in high-risk surgeries. Recordings may impel surgeons to follow conventional surgical steps and avoid making procedural changes or take more risks when the patient's condition deteriorates during surgery. Medical professionals are not in "pursuit of profit" and may consider videos as unnecessary, given that the well-being of patients is their primary motivation, requiring neither other incentives nor monitoring. In addition to the potentially neutral effects on the performance of surgeons, patients may also be concerned about their privacy and potential uses to which the videos may be put (e.g., commercialization). Medical laws around the world strictly control the privacy of patients, and disclosure of videos may amount to psychological and legal violation of the privacy that patients have a right to expect.

Overall, from the technology acceptance model perspective, the 3D surgical video creates a contextual construct deeply embedded in patient–practitioner expectations, beliefs, and values. Acceptance of the technology is situated in a wider locus of non-technological factors that can severely limit the application of such technology. At the core of these factors are trust-related and risk-related concerns that are embedded indirectly in social and institutional influences, anxiety, and resistance to technology (Kamal, Shafiq, & Kakria, 2020). With improvements in surgical skills as a later-stage outcome, the important antecedent is the presence of trust in the technology. Therefore, our mediation chain does not go from surgical skills → risk → trust but, instead, from risk → trust → skills. Risk and trust have been the core elements of the technology acceptance model in medical care technologies (Pavlou, 2003).

Perceived lower risk from 3D surgical videos for patients

Risk perceptions related to 3D surgical videos could be conscious or subconscious. Perceived risk is defined "as the perception of a person if he/she decides to undertake an action or activity" (Kamal et al., 2020). 3D surgical videos could increase risk perceptions because they increase concerns on whether they improve or worsen surgical performance, their financial implications for costs on the system, social concerns in the use and adoption of the technology, their interference with other elements in the operating room, and psychological concerns about being recorded (Kamal et al., 2020). These factors present serious non-trivial implications. Patients may be concerned that the risks of these technologies may increase surgical complexity, interfering with the surgeon's ability to focus, and they may increase psychological discomfort from being recorded, with the added perception that their limited benefits come with higher costs. The risks in the current context are especially salient because new technology requires a significant change in the dynamics of service provision with only limited information on its benefits. With inadequate evidence to evaluate a new system, users may be risk averse because they may be psychologically inertial to new technology and perceive greater risks.

Perceived need for trust in 3D surgical videos for patients

Trust is an important element of eHealth services and telemedicine (Hu, Chau, Sheng, & Tam, 1999). Trust is at the core of maintaining relational capital (Goundar, Lal, Chand, & Vyas, 2021). The perceived need for trust refers to the willingness of patients to engage in relational exchanges. Trust requires a party to be vulnerable. This vulnerability increases perceived risks, which may, in turn, influence engagement with the technology and lead to the perception of improvements in surgical outcomes. Based on Kamal et al. (2020), trust is defined as "faith in the adoption of a new technology that end-users/patients place in it with regards to the services this technology can provide." Therefore, the perceived trust refers to the degree to which patients exhibit confidence in the infrastructure of recording, accessing, and using the videos, and the potential for misuse of videos in the future.

Perceived trust may be influenced by sociocultural influences (Mohamed, Tawfik, Norton, & Al-Jumeily, 2011). The single-payer system in Sweden may influence social values and behaviors in assessing how individuals broadly perceive such technologies and how collectively society perceives the costs and benefits of these add-ons in terms of the system's ability to deliver quality healthcare. The medical system as a collection of procedures, people, and infrastructure is perceived as a set of facilitating conditions that help to assess patient control and to determine how the new technology influences the overall ecosystem of services. Anxiety toward the technology could trigger an emotional response in which limited understanding of the use and implications of the technology could lower trust. New technology also raises concerns about information privacy stemming from the newer infrastructure's requirement for the storage, access, and retrieval of videos. It calls for increased faith (and, therefore, trust) in the system in order to facilitate and maintain such technology initiatives (Trohman, 2010).

With the above discussion as a backdrop, we propose the following hypotheses.

Hypotheses development

Lower perceived risk and the need for trust

Research suggests that perceived risk is an antecedent to trust (Bahmanziari, Pearson, & Crosby, 2003; Lippert & Davis, 2006; Mayer, Davis, & Schoorman, 1995; Srivastava, Chandra, & Theng, 2010). Perceived risk in the current context refers to the uncertainty concerning the value of 3D surgical videos for the patient. Perceived risk relates to the expected losses in a medical innovation situation that is opaque and ambiguous – a context where the user is not fully aware of the benefits of good, reputable medical care (Jabeen, Hamid, Akhunzada, Abdul, & Ghouzali, 2018; Mechanic, 1996). Perceived risk is the key to developing behavioral intentions concerning the use of a service (Garcia-Retamero & Cokely, 2017; Mitra, Reiss, & Capella, 1999). According to Pavlou (2003), perceived risk is associated with lower trust. In the TAM model, perceptions of risk could have a significant impact on the intentions of users to adopt technology, especially in the medical technology sector where sensitivities are higher, and the perceived risks are greater. In the current context, the adoption of 3D surgical videos presents a dichotomy. On the one hand, the availability of such technology can lead to increased accountability for the surgeon but, on the other hand, it can lead to heightened privacy concerns. Such risks associated with information technology can lead to increased perceptions of loss and, thus, intensify behavioral uncertainty in availing of surgical services that are recorded on video. Uncertainty and risk stem from wide-ranging concerns about the unpredictable nature of the use of technology (Linkov et al., 2018) and the limited ability to exercise control over access to the 3D videos after the surgery is completed. This lack of control and risk of disclosure can lower the sense of security and could well act as a barrier to the adoption of a technology. When the perceived transaction costs and the ensuing privacy concerns are too great, perceptions of risk are likely to be higher, leading to a reduced probability of adoption.

When the perceptions of risk are lower, the need for trust is likely to be lower, thus facilitating the utilization and further development of the technology. Trust and risk are intrinsically linked. When risk perceptions are lower, the need for trust is lower (Featherman & Pavlou, 2003; Pavlou, 2003). Trust is essential in transactions where patient sensitivity is greater, given the duality of risk and return from 3D surgical videos. Consequently, lower perceptions of risk – which give rise to a lower need for trust – may be essential if increased reliability is to be developed and positive exchanges with patients are to be forged in the move toward implementing and leveraging the technology. Security and privacy concerns may be lower, driving risk concerns lower and, therefore, reducing the need for trust. Because privacy and security concerns are balanced against the benefits of 3D surgical videos in post-operative care, we expect lower perceived risk to reduce the need for trust in the surgical team and in the technology (Carter & Bélanger, 2005; Pavlou, 2003). Based on the above discussion, we propose the following hypothesis:

Hypothesis 1: The perceived lower risk for patients from 3D surgical videos will be negatively associated with the perceived need for trust in 3D surgical videos.

Need for trust and surgical performance

Since "trust mediates relationships between humans, it may also mediate the relationship between human and medical innovation (Sheridan, 1975; Sheridan & Hennessy, 1984)" (Choi & Ji, 2015, page 693). In the medical innovation literature, trust is center stage in terms of positive beliefs in and usage of medical innovation. By helping to propagate the ability, the benevolence, and the integrity to develop trust, lower risk could generate improved assessments of service predictability, enhanced perceptions of functionality, and higher reliability in the use of the service to improve post-operative outcomes. The reduced perception of risk that drives the lower need for trust could facilitate improvements in surgical skills by helping to enhance the reliability of the operating systems. Recordings allow for evaluation and assessment, and learning facilitated by lower concerns from patients supports improved performance (Hoffmann, Söllner, Fehr, Hoffmann, & Leimeister, 2011; Lee & Moray, 1994; Söllner, Hoffmann, Hoffmann, & Leimeister, 2011; Söllner, Hoffmann, & Leimeister, 2016).

Based on the discussion above and the analysis underpinning Hypothesis 1, we propose the following hypotheses:

Hypothesis 2: The perceived need for trust in 3D surgical videos is negatively associated with perceived improvements in surgical skills.

Hypothesis 3: The perceived need for trust in 3D surgical videos mediates the relationship between perceived lower risk from 3D surgical videos for patients and perceived improvements in surgical skills.

Methods

Sample

The location of the study was a major hospital in Sweden. The survey was distributed to all staff at the Children's Heart Center in Skåne University Hospital, specializing in pediatric heart surgery. The context of the study is an early-stage effort to assess the commercialization potential and viability of 3D surgical videos.

Q-sort for developing measures. We conducted a pilot study to develop the measures for the study. As discussed earlier, the study is exploratory, and we are not aware of a set of scales that are specifically developed for this particular context. Therefore, we asked twenty members of the staff, directly involved in the peri-operative and intra-operative care of the patient to participate in a Q-sort study to identity the measures. The goal is not to develop a psychometrically validated scale but to develop a bottom-up understanding of the underlying trust, risk, and surgeon skill benefits. We split the group into two. We asked the first group to provide a list of trust-, risk-, and skills-related concerns. We consolidated the most commonly listed items into a list of eighteen items. Next, for the remaining group, we asked the participants to undertake a Q-sort of the eighteen items across the three categories. We retained those items in each category with 80% or higher agreement. We used these items in the survey.

Data collection. For the data collection, we used the items from the Q-sort to assess the degree to which the new technology could have multiple benefits for surgeons while considering the perceived benefits for customers. In assessing the commercialization benefits of the underlying technology, the staff would likely be knowledgeable on both the surgical and the patient benefits. Surgeons may be biased in their reporting because they face potential liabilities in a recorded surgery. However, surgeons are equally concerned about the well-being of patients and may implicitly pursue the interests of patients with or without the video. Patients may not be sufficiently aware of the complexities and the benefits of the technology to fully assess its value. The non-surgeon staff function as an important linchpin between patients and surgeons in assessing the value of technology as a vehicle for improving surgical skills.

A total of two hundred employees were identified. The survey was distributed to participants in the form of a hard copy. When the respondents had doubts about the wording of the questions, the author, acting as a point of contact, provided the necessary clarification. We received eighty-five complete responses.

Measures

Perceived improvements in surgical skills – outcome variable. The measure of perceived improvements in surgical skills by staff is based on three items: a) impact on surgical performance [0 being not at all impactful and ten being extremely impactful]; b) usefulness in advancing surgical skills [0 being not at all useful and 10 being extremely useful]; and c) increased attentiveness/carefulness [yes/no]. We take the factor score, given the formative nature of the scale.

Perceived lower risk from 3D surgical videos for patients – predictor variable. The measure of perceived benefits from 3D surgical videos by staff is based on four items: a) detrimental effect on patient [yes/no]; b) usefulness for post-operative care [0 being not at all useful and 10 being extremely useful]; c) usefulness in monitoring recovery [0 being not at all useful and 10 being extremely useful]; d) patient identified from video [reverse coded; 0 being not at all likely and 10 being extremely likely]; and e) potential damage to patient in terms of personal costs [reverse coded; 0 being not at all harmful and 10 being extremely harmful]. We take the factor score of the four items that are the formative scale.

Perceived need for trust in 3D surgical videos – mediator variable. The scale item includes three items: a) patients' preference for documented surgery; b) patients' belief in more trustworthy surgery; and c) patients' choice concerning surgery recording. The items were measured as yes or no. We take the factor score of the dichotomous responses (the additive scores led to similar inferences).

Controls. We use controls for department (Avd 67; BIVA; operating room staff, gender (male/female), and age (<30 years; 30-45 years; 46-60 years; >60 years).

Results

Table 1 presents the sample descriptives. The perceived improvements in surgical skills were negatively associated with the perceived need for trust in 3D surgical videos ($r = -0.27$, $p < 0.05$). However, perceived improvements in surgical skills were positively but not significantly associated with perceived lower risk for patients from 3D surgical videos. We do not find a strong association between perceived improvements in surgical skills and the controls. The perceived need for trust in 3D surgical videos was negatively associated with the perceived lower risk for patients from 3D surgical videos ($r = -0.23$, $p < 0.05$).

Hypothesis 1 proposed that the perceived lower risk for patients from 3D surgical videos was negatively associated with the perceived need for trust in 3D surgical videos ($\beta = -0.1123$, $p = 0.027$). Hypothesis 2 proposed that the perceived need for trust in 3D surgical videos was negatively associated with perceived improvements in surgical skills ($\beta = -0.3416$, $p = 0.007$). Hypothesis 3 proposed the net mediation effect, in which the perceived lower risk for patients from 3D surgical videos is positively associated with improved surgical skills through the perceived need for trust in 3D surgical videos. Based on bootstrap standard errors, the mediation effect was 0.038 (95% C. I. = 0.0027 to 0.1081).

Discussion

In this study, we investigated the challenges in using 3D surgical video technology in a hospital setting. To understand the psychological concerns and practitioner benefits from the new technology, we selected a sample of operating room staff members to assess the balance of patient concerns and surgeon benefits. Using a technology adoption mode, we considered the role of perceived loss and trust in facilitating improved surgical skills. We found support for the full mediation effects – the lower perception of risk drives the need for trust lower, with a consequent improvement in surgical skills (Fig. 1, Table 2).

Theoretical implications

To understand the challenges in adopting newer technology, we explored this research question from the vantage point of operating room staff assessing the perceived risk and the need for trust. Our results show that, only when the perceived risk is lower – driving the need for trust lower – can surgical skills benefit. The findings of this research shed light on the challenge that adopting newer technology poses for patient privacy, whilst realizing the added benefits that 3D video technology brings to surgeons. To predict the likelihood of user adoption in a more opaque decision-making environment where patients are generally less informed, we relied on information provided by operating room staff members. Lower perceived risk prompting a lower need for trust can play a central role in perceived improvements in surgical skills (Barham, Chavas, Fitz, Salas, & Schechter, 2014).

Trust is an important element in technology adoption (Bahmanziari et al., 2003). With growing concerns over privacy, the proposed model provides an important complement to our understanding of apprehensions relating to technology adoption and its future improvement. The results indicate that the need for trust, driven by a

Table 1
Descriptives.

	Variable	mean	sd	min	max	1	2	3	4	5	6	7	8	9
1	Perceived improvements in surgical skills	0.0000	0.5092	-0.9724	0.8629	1								
2	Perceived need for trust in 3D surgical videos	0.3804	0.4183	0	1	-0.2681*	1							
3	Perceived lower risk from 3D surgical videos for patients	0.0000	0.9050	-1.9771	1.2614	0.1472	-0.2248*	1						
4	Department: BIVA [ref. Avd 67]	0.5647	0.4987	0	1	0.0559	-0.0528	0.3140*	1					
5	Department: Operating room staff	0.2353	0.4267	0	1	-0.1568	0.0039	-0.1619	-0.6318*	1				
6	Gender [1=female; 2=male]	1.1176	0.3241	1	2	-0.022	-0.0121	0.0012	0.0996	-0.0304	1			
7	<30 years (age)	0.3294	0.4728	0	1	0.114	0.0411	0.0217	0.06	-0.2117	0.0548	1		
8	30-45 years	0.4706	0.5021	0	1	0.0033	0.0256	-0.0159	-0.0755	0.1994	-0.1248	-0.6608*	1	
9	46-60 years	0.0588	0.2367	0	1	-0.1372	-0.1084	-0.0746	-0.0831	-0.0208	0.0639	-0.1752	-0.2357*	1
10	more than 60 years	0.1294	0.3376	0	1	-0.0663	0.0126	0.0523	0.0557	0.034	0.0768	-0.2702*	-0.3635*	-0.0964

Notes.
$N = 85$; *$p<0.05$ (two-tailed).

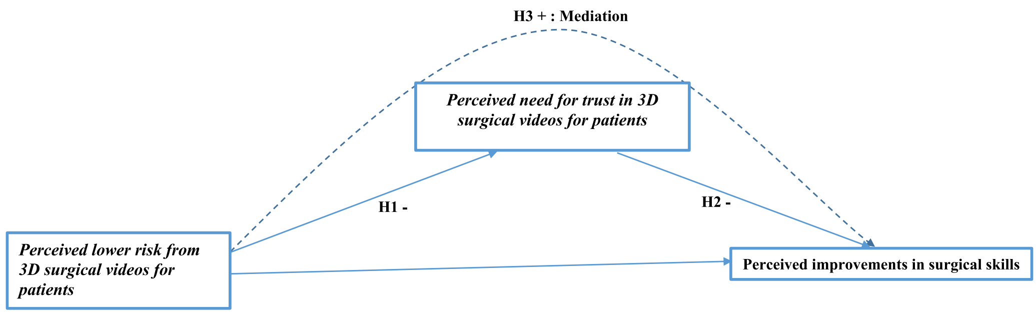

Fig. 1. Conceptual model.

lower perception of risk from 3D surgical videos, is an important consideration in adopting a valuable technology, which comes with increased concerns about privacy and disclosure but also offers the prospect of improved care. The model is particularly informative for those facing the dilemma of developing and leveraging such technology and provides useful guidelines. The important takeaway point is that lowering risk perception and engendering a lower need for trust can garner improvements for all stakeholders.

Managerial implications

Despite the value proposition of such technology for the healthcare ecosystem, we find that concerns expressed by healthcare professionals – who are not surgeons but are nonetheless familiar with the challenges – highlight the important need to lower risk perceptions in order to improve trust, which may strengthen the value proposition of considering improved surgical risks. The findings indicate that efforts to implement a functioning and beneficial technology may meet with increased resistance due to risk and trust issues. The technology adoption model is pertinent to the needs of medical practitioners and professionals as they consider the beneficial effects of technology in the context of adoption. Resistance driven by lower trust and increased risk perception can influence why viable technologies may not be adopted.

In interpreting the findings, the Swedish context should also be considered. As a universal healthcare system, giving consideration to trust and risk is strong. It is possible that respondents (healthcare professionals responding to the survey) may be concerned about the implications for the system, its participants, and the processes that may multiply risks. We have only observed the responses to the scale items. However, richer concerns stem from unobserved calculus in assessing the value of the technology. Lower perceived risks and higher trust are important elements in driving the benefits that accrue from improvements to surgical skills.

Limitations

This research is not without its limitations. First, the respondents were selected as operating room staff with an awareness of both patients and surgeons and with the lowest conflict of interest. A multi-respondent survey connecting competing preferences and assessments of potential gains is essential to address the challenges

Table 2
Path analysis estimates.

DV = Perceived improvements in surgical skills		Coef	s.e.	z	p -value	95% C.I.	
	Perceived need for trust in 3D surgical videos	-0.3416	0.1271	-2.69	0.0070	-0.5908	-0.0924
	Perceived lower risk from 3D surgical videos for patients	0.0441	0.0613	0.72	0.4720	-0.0761	0.1643
	Department: BIVA [ref. Avd 67]	-0.1379	0.1407	-0.98	0.3270	-0.4137	0.1380
	Department: Operating room staff	-0.2688	0.1605	-1.68	0.0940	-0.5834	0.0457
	Gender [1=female; 2=male]	-0.0098	0.1603	-0.06	0.9510	-0.3240	0.3044
	<30 years (age)	0.2178	0.4825	0.45	0.6520	-0.7279	1.1634
	30-45 years	0.1812	0.4799	0.38	0.7060	-0.7595	1.1218
	46-60 years	-0.2022	0.5186	-0.39	0.6970	-1.2187	0.8142
	more than 60 years	0.0894	0.4950	0.18	0.8570	-0.8809	1.0596
	_cons	0.1253	0.5091	0.25	0.8060	-0.8725	1.1232
DV = Perceived need for trust in 3D surgical videos	Coef						
	Perceived lower risk from 3D surgical videos for patients	-0.1123	0.0509	-2.21	0.0270	-0.2121	-0.0126
	Department: BIVA [ref. Avd 67]	-0.0060	0.1201	-0.05	0.9600	-0.2413	0.2293
	Department: Barn OP	-0.0469	0.1368	-0.34	0.7320	-0.3151	0.2213
	Gender [1=female; 2=male]	-0.0134	0.1367	-0.1	0.9220	-0.2814	0.2546
	<30 years (age)	0.4316	0.4090	1.06	0.2910	-0.3699	1.2332
	30-45 years	0.4225	0.4069	1.04	0.2990	-0.3750	1.2200
	46-60 years	0.1974	0.4419	0.45	0.6550	-0.6688	1.0636
	more than 60 years	0.4398	0.4196	1.05	0.2950	-0.3826	1.2623
	_cons	0.0002	0.4344	0	1.0000	-0.8511	0.8516
	var(e.surgeonskills)	0.2185	0.0335			0.1618	0.2952
	var(e.patientpreference)	0.1591	0.0244			0.1178	0.2149
	Mediation effect [bootstrap standard error with 1,000 samples]						
Indirect effects (1,000 bootstrap samples)	Observed Coef.	Bias	Std. Err.	Bootstrap [95% C.I.]			
Effect	0.0384	0.0002	0.0267	0.0002	0.1006	(P)	
				0.0027	0.1081	(BC)	

(P) percentile confidence interval.
(BC) bias-corrected confidence interval.

in such technology adoption settings. Second, the proportion of male operating room staff members was small, suggesting the potential for gender bias in such reports. Third, our study focuses on a very early stage of the technology adoption process and, therefore, our findings should not be construed as applicable to the longer term or to a wider range of hospitals. We call on future research to validate and assess these results in alternative contexts. Fourth, the study is confined to the Swedish context and, therefore, the findings of this study ought to be generalized to other contexts.

In conclusion, the study has focused on the potential divergence between the needs of patients and the benefits for surgeons in the context of implementing newer technology. The divergence between needs and skills acquisition could well be located at opposite ends of the motivation cycle. However, we find that the lower need for trust is an important driver of improved gains for surgeons. Based on the prior literature, pro-sociality and information sharing could prove to be important mechanisms for lowering perceived risks and for reducing the need to trust the technology.

[1]Taking the factor score of the three dichotomous items resulted in similar inferences.

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