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Work-related factors influencing doctors search behaviors and trust toward medical information resources

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ABSTRACT

Regulation of clinical practice is a characteristic aspect of the medical profession. Regardless of whether this regulation derives from government-sourced guidelines or materials from government-sponsored institutions, it results in a high production of information resources (institutional information resources), which are disseminated to the clinical stuff in order to ensure compliance. In that case, the issue of credibility of these information resources might arise, since medical practice is characterized by a high frequency of change. The latter involves a continuous effort on the part of the clinical staff, which is motivated by work-related factors (e.g., need for compliance) or personal motivation (e.g., need for self-improvement). In this study we consider a simple trust model, according to which we assume that perceived trust is a direct antecedent of perceived credibility. We evaluate whether work-related or personal motivating factors influence the relation between perceived credibility and trust toward institutional information sources and how the effect of each factor affects this relation. Findings suggest that work-related factors have a higher impact on the relation between credibility and trust than personal motivation factors, while they are stressing the important role of hospital libraries as a dissemination point for government-sponsored information resources.

1. Introduction

Healthcare professionals represent a critical class of knowledge workers from the viewpoint that they require access to high-quality medical information in order to improve their service quality (Case, 2012). From that point of view the quality of medical information becoming available to them through the internet is a critical factor for achieving high-quality healthcare services (Clarke et al., 2013; Hersh, 2008; Jamal, McKenzie, & Clark, 2009). In the context of healthcare the drive for high specialization and increased demand for specialized know-how have an effect on shaping the information needs for both medical and nursing staff (Pearson & Rossall, 2001; Thain & Wales, 2005). Furthermore, this complexity has generated heterogeneity of information needs, which vary across the different specialties and functions of medical professionals.

A traditional source of information, hospital libraries, has been acknowledged as playing a significant role in providing highly reliable information to end users (Kostagiolas & Kaitelidou, 2009). However, user information needs and information seeking behaviors have become rather complicated and cannot be addressed exclusively by hospital libraries any longer (Thain & Wales, 2005). Factors such as advances in medical research and willingness for professional development in conjunction with the continuous flow of medical information available to patients (Dickerson et al., 2004; Jackson et al., 2007) have advanced the information needs of healthcare professionals to a more technical level. Hospital libraries often impose certain limitations including restricted information resources availability, outdated collections, and sometimes rather old-fashioned services, which require too much time for little return (Klein-Fedyshin, 2010; Tooey, 2009). However, some of these limitations have been addressed by information technology advances and trends in the circulation of scientific material. On the other hand, hospital libraries are thought to provide healthcare professionals with high quality information in a reliable way, if compared to information obtained by searching the Internet (Harrison & Beraquet, 2010). Another perspective on hospital libraries includes the role of the clinical librarian as a trustworthy mediator of information within the doctors' work environment, by working alongside the doctors and supporting clinical decision making (Lappa, 2005).

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Rarely do medical professionals make evaluative judgments of information resources, although they are well aware of the need for information quality. They make wide use of resources that they already know and, thus, have grown to trust (Hughes, Wareham, & Joshi, 2010). In their everyday practice, doctors can seek information from colleagues, conventional resources such as libraries, and online information resources. It is, as a result of this variety of possible information sources, interesting to examine attitudes toward perceived trust of the various information resources employed by doctors in their daily medical practices when treating patients. For example, although searching for health information through what is easily accessible on Web 1.0 or Web 2.0 media resources is rather common (Metzger & Flanagin, 2011), the issue of trustworthiness when doctors' employ specific online information resources in their daily routines is rather unclear. Internet and Web 2.0 information technologies provide a rather complex and vast information landscape with an abundance of medical information (Masters, 2008). This abundance of online healthcare information, however, provides an additional obstacle when doctors' are seeking information to satisfy real life clinical related information needs (Metzger & Flanagin, 2011). Furthermore, some authors challenge the effectiveness of various medical information resources because of the fact that most doctors go directly to the sites they know and they trust (Hughes et al., 2010).

In information seeking behavioral studies of practicing medical doctors, it is emphasized that clinical decision making in health should be safeguarded from inaccurate information (Metzger, 2007). Therefore, it is critical that, although alternative information resources may each have a number of benefits for health professionals, their use within day-to-day medical practices requires information literacy skills. Perceived trust toward a specific information resource is considered to be an important issue if this particular information resource is to be preferred by doctors (Zulman, Kirch, Zheng, & An, 2011).

While the medical profession is characterized by a high demand for knowledge, it is at the same time highly regulated by government-sponsored institutions that provide guidelines for all aspects of clinical practice—from the evaluation of clinical trials to the way medical treatment is administered. Indeed, compliance with government regulations, guidelines, and standards entails a high level of complexity and the information in question should be easily accessible by doctors at the time and point of need in the workplace. Such information is, therefore, expected to be available in a hospital library or information repository, where government reports and materials sourced from government regulatory bodies and public institutions are collected and are accessible by the staff. While past research has addressed the case that some information sources are trusted more by medical practitioners than others (Frewer, Howard, Hedderley, & Shepherd, 1996), a more detailed analysis as to whether work-related factors affect this attitude of trust needs to be undertaken. Thus, this study is motivated by the fact that the issue of trusting institutional (government sponsored) information sources has a direct consequence on regulatory compliance, patient safety, and the quality of healthcare delivery. Therefore, these information resources play an important role in keeping healthcare delivery consistent with evidence-based practices. In particular, in this study we are interested in examining the effects of intrinsic (personal driven) and extrinsic (work related) factors of information needs on shaping trust toward institutional information resources. This leads to the following hypothesis: "*To what extent do work-related and personal motivation factors for information seeking and knowledge updating affect trust toward institutional (government sponsored) information sources*."

We use a simple trust model, in which we assume that trust toward an information resource derives from the perceived credibility of an information source is influenced by both the individual's work environment and personal motivations. We use a path model to assess the effect of the perceived importance of motivation sources at work and individual motivational factors on shaping the relation between perceived credibility and perceived trust toward institutional information sources.

This paper is structured as follows. Section 2 provides the theoretical model used in our study, including the model factors and the hypothesized effects to be evaluated. Section 3 provides an empirical analysis of the theoretical model with analysis and results discussed in Section 4. A subsequent discussion of the findings is presented in Section 5, which also outlines limitations and issues for further research.

2. Conceptual development

2.1. Model definition

2.1.1. Heterogeneity of information needs

The literature suggests that the information needs of healthcare professionals vary according to different professional groups and specializations with physicians having numerous and various information needs (Denekamp, 2007; Lawson, Forbes, & Williams, 2011) that mainly relate to on the spot treatment, diagnosis, and pharmaceutical treatment (Cheng, 2004; Davies, 2007; González-González et al., 2007). Boissin (2005), in an early study on information-seeking behaviors and the use of the Internet in France, reported that physicians face three types of information needs: diagnostic, treatment information on the patient's diagnosed condition, and general medical matters. A complimentary study by Thain and Wales (2005) categorized motives for information seeking in research, professional development, patient care, identifying patient information, determining guidelines for patient care, and resolving difficult and rare cases. While medical doctors are more research oriented during their information seeking, the information needs of nursing staff relate more to pharmaceutical treatment and diagnosis, and differ according to their work position and the nature of their duties (Turner, Stavri, Revere, & Altamore, 2008). With regard to the latter, nurses holding a master's degree appear to have more information needs as compared to their counterparts without such a degree (Cogdill, 2003). Nurses mainly seek information on day-to-day patient care either from their colleagues, a physician, or the patient's medical record (Blythe & Royle, 1993). When seeking information, nurses usually face significant problems related to inaccurate data or incomprehensible information, while access to effective information sources is considered to be crucial in making the right decisions and reducing professional stress (Cogdill, 2003; Leckie, Pettigrew, & Sylvain, 1996).

2.1.2. The influence of perceived credibility on shaping trust toward information sources

Information source credibility has been considered as one of the most critical attributes of an information resource on influencing the users toward trusting it. *Source* credibility differs from other closely related information credibility dimensions [refer to Metzger, Flanagin, Eyal, Lemus, & McCann, 2003 for an extended review], such as medium and message credibility, in that it focuses on the information source's believability and motivation to provide accurate, trustworthy, and truthful information (Hu & Sundar, 2010). Extant studies in information science reveal a positive association between source credibility and the formulation of trust to 'consume' or 'use' the information deriving from that source (Lucassen & Schraagen, 2012). For example, online websites with logos designed to communicate elements of a company's credibility, such as expertise and trustworthiness, are found to trigger more positive credibility judgments, which in turn, may result to

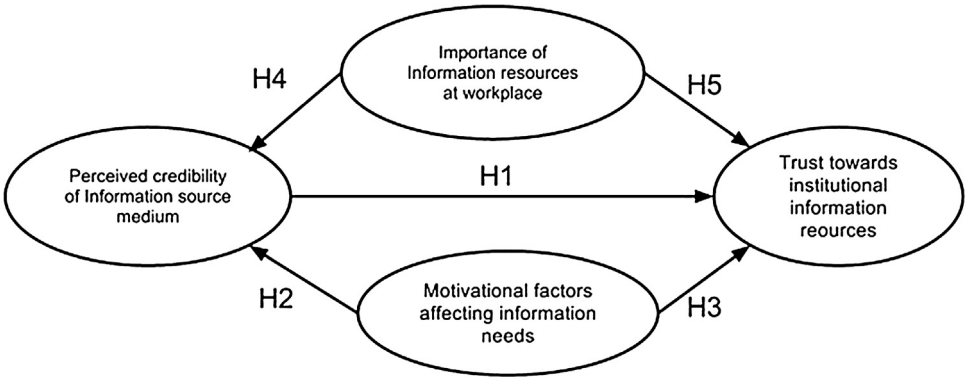

Fig. 1. Theoretical model.

increased traffic and sales (Lowry, Wilson, & Haig, 2014). Likewise, authoritative information sources are likely to receive higher trust perceptions than non-authoritative ones (Koh & Sundar, 2010). Along this line, trusting the information source may result in increased adoption and use behavior (Bélanger & Carter, 2008; Carter & Bélanger, 2005; Shin, 2010).

In the context of information seeking for medical information, credibility has been assessed as a principal construct in cases of patient's trust in the information they receive from strangers in the form of advice (Eysenbach & Köhler, 2002) or the effect of the resources during the information seeking process (Bates, Romina, Ahmed, & Hopson, 2006). The same argument also applies in workplace environments; in cases that medical professionals face uncertainty in their clinical decisions they are likely to seek information from sources (e.g., colleagues) that they consider trustworthy and credible (Marshall, West, & Aitken, 2013). In effect, the credibility of the medical information source is a factor that influences professionals' perceived satisfaction with the information they receive from a source (Anker, Reinhart, & Feeley, 2011).

Thus, previous research suggests that credibility is influenced by the heterogeneous factors affecting information seeking of healthcare professionals and their attitude toward trusting a particular information resource. We direct our consideration to government provided information resources, taking into account (a) the differentiation that might exist in the format of the information resource, (b) the influence of personal motivational factors, and (c) work related factors. We present the theoretical model in Fig. 1. Based on the theoretical model, we expect perceived credibility to have a positive direct effect on trust, which leads to the following overall hypothesis:

H1. The perceived credibility of the information sources during information seeking significantly affects the perceived trust toward institutional information resources.

The model is composed of four different factors: (1) Trust toward institutional information resources is directly affected by (2) the importance of information resources at the work place, (3) the perceived credibility of information resources, and (4) the motivational factors affecting information needs. We discuss these factors and their related hypotheses in the sections that follow.

2.2. Personal motivation for information seeking and perceived trust

Healthcare professionals are faced with a constantly expanding information space, which creates challenges but also offers many new opportunities. Their role and the inherited uncertainties in the clinical decision making processes in the workplace provide a source of personal motives and needs for seeking information. Under the lenses of Wilson's macro model (Wilson, 2006) which informs our hypotheses, information seeking is a person-centered, role driven activity aiming to reduce uncertainties in the doctor's clinical decision making. Therefore, when specific information needs arise, doctors seeking information in information sources relative to their perceived trust. It has been confirmed that doctors will actively seek credible and trustworthy information when they need to make important clinical decisions (Alaszewski, 2005). To meet these needs healthcare professionals may select from a plethora of alternative information sources, either within their workplace (e.g., hospital libraries and colleagues) or external ones (e.g., medical web resources) (Clarke et al., 2013). This richness of available health information creates an interesting paradox. Instead of feeling satisfied, healthcare professionals tend to feel overwhelmed by the abundance of health information because they lack the skills or time to access, filter, and process it (Anker et al., 2011; Hall & Walton, 2004). Such information overload may, in turn, negatively impact medical practice and work productivity (Clarke et al., 2013). Hence, as healthcare professionals use more and more different sources of information they may feel more empowered to employ those, which they trust in their workplaces.

Information science literature provides evidence on the relation between information properties, user characteristics, and trust formulation. Metzger (2007) argues that information seekers' motivations influence the degree of credibility and trust they assign to each information source. Along this line, Lucassen and Schraagen (2011) posit that domain expertise and corresponding users' information skills and desired information features may lead to variations in trust judgments.

In the context of healthcare, professionals would arguably weight their information needs differently depending on the task type. Critical work-related tasks would likely have a greater importance compared to personal development tasks (e.g., medical research). Therefore, different tasks require different cognitive search strategies (Hughes et al., 2010) and this task influence may affect the reasons or motives for information seeking as well as the perceived trust and credibility of each source. Indeed, doctors tend to seek authoritative sources in clinical practice for their knowledge management purposes (Dawes & Sampson, 2003). Nevertheless, although in the past few years there has been a proliferation of research on the information seeking behavior of medical professionals, relatively little research has addressed the impact of the employment of specific information resources on physicians' behavior toward utilization of this information in the workplace. Overall, the personal information role-driven motives that generate specific information needs (e.g., diagnosis, treatment, information about medication, research) may affect the perceived credibility of the different information sources (Koch-Weser, Bradshaw, Gualtieri, & Gallagher, 2010) as well as trust of institutional (or

governmental) information sources. This leads to the following hypotheses:

H2. Motivational factors affecting information needs positively influence the perceived credibility of the information sources.

H3. Motivational factors affecting information needs positively influence trust toward institutional information sources.

2.3. Work related information sources availability and perceived trust

Information availability in the workplace does not necessarily imply better informed doctors and the perceived trust of information sources is one point of departure. As argued in the previous section, although information availability has significantly increased over the last decade, the literature suggests (e.g., Kritz, Gschwandtner, Stefanov, Hanbury, & Samwald, 2013) that medical professionals have unmet information needs in their workplace. Interestingly, the information seeking behavior of medical professionals tends to favor information sources that exist in their workplace (e.g., colleagues or hospital libraries) over external sources (e.g., Internet medical databases) (Clarke et al., 2013; Davies & Harrison, 2007). This behavior may be due to the increased level of perceived familiarity that such sources exhibit for their consumers.

Indeed, source expertise has been reported as an important antecedent of formulating trust judgments in health information (Yi, Yoon, Davis, & Lee, 2013). Under this lens, information seekers rely on their previous experiences with each alternative source of information, their domain expertise, and information skills to access each source in order to develop a routine information selection process (Lucassen & Schraagen, 2011). This routine helps to mitigate the uncertainty and risk about the expected outcomes with each health information source, which, in turn, is related to the credibility of the source (Eastin, 2001; Yi et al., 2013). Extant research has acknowledged that medical professionals face a series of obstacles in regard to the selection of information sources outside their workplace (such as the Internet), which mainly relate to reliability, validity, and credibility (Hider, Griffin, Walker, & Coughlan, 2009). The above studies provide useful insights into information needs and offer some explanation of healthcare professionals' information seeking behavior in their effort to make sound medical decisions. For example, emphasis is given to the importance of good communication with health professionals, highlighting the provision of quality information as "a prerequisite" for an effective "partnership" (Yi et al., 2013). Arguably, healthcare professionals would attribute increased credibility and trust toward information sources that exist in their workspace because these are characterized by increased familiarity, convenience of access, and a closer matching to their information skills. Ergo, we propose the following research hypotheses:

H4. Availability of information resources at the workplace positively influence the perceived credibility of the information sources.

H5. Availability of information resources at the workplace positively influence trust toward institutional information sources

3. Data and methods

Data for this study was collected using a paper based questionnaire, mainly composed of the instruments used by Feeney and Moran (2007), Powell and Clarke (2006), and Wilson (2006). The questionnaire is comprised in total of six (6) parts. Part (A) contained demographic and professional information. The second part included questions on PC use at home or at work, Internet connectivity, availability of electronic information sources from home or at the clinic. Parts (C)–(E) collected information about the credibility and trust accorded to different information services as well as information about motivational and work-related factors that influenced their information seeking behavior. The final part (Part F) of the questionnaire contained an open-ended question asking the respondents to express their opinion and make suggestions on improving information seeking and lifting obstacles so as to achieve a better access to scientific information in the future.

The questionnaire was distributed in one of the largest private hospitals in Greece, with capacity exceeding 400 beds, after the approval of the clinic's scientific committee. Data collection was targeted to all clinical employees across the different professional categories (including both doctors and nursing staff). A pilot test was conducted with 10 participants. Based upon the feedback and requests for clarification that were obtained during the pilot test, the questionnaire was revised. The final version of the questionnaire was distributed to the employees and results were collected between April and May 2012. Out of 199 distributed questionnaires, a total number of 120 were returned, from which 118 were suitable for analysis, resulting in a response rate of roughly 60% ($N = 118$). Based on the theoretical model outlined above, we operationalized the items into four constructs and assigned the items into them. Respondents were asked to evaluate their information sources on the basis of a Likert (1–5) scale (Parts C through E of the questionnaire). All items by construct are available in Tables 1–4.

The first part of the questionnaire (Part A) collected demographic data and personal information. Out of 118 respondents, 39% were men and 61% were women. Age was encoded using a binary scale (under or above 40) in order to assess seniority in the profession. From the survey respondents' sample, 69.5% ($n = 82$) of the respondents were 40 years old or younger and 30.5% were older than 40 years old ($n = 36$). In relation to education level, 25.4% of

Table 1
Perceived credibility of information source medium. $N = 118$.

Perceived credibility of information source medium (alpha: 0.80)	1	2	3	4	5	6
(1) Scientific databases (IMPMED1)	1.00					
(2) Search engines (IMPMED2)	0.12		1.00			
(3) Electronic scientific journals (IMPMED3)	0.23*	0.41***	1.00			
(4) Public institutions web pages (IMPMED4)	0.28**	0.29**	0.62***	1.00		
(5) Company web pages (IMPMED5)	0.26**	0.45***	0.60***	0.47***	1.00	
(6) E-books (IMPMED6)	0.28**	0.42***	0.64***	0.62***	0.63***	1.00
Mean	3.4	4.3	2.9	2.6	2.6	2.6
St. dev.	1.5	1.1	1.3	1.1	1.1	1.3
Min	1	1	1	1	1	1
Max	5	5	5	5	5	5

* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

Table 2
Trust toward institutional information sources (Cronbach's reliability index $\alpha = 0.81$), $N = 118$.

Trust toward institutional information sources (alpha: 0.81)	1	2	3	4
(1) Ministry of Health (TRUSTINF1)	1.00			
(2) Regional Hygiene Services (TRUSTINF2)	0.66***	1.00		
(3) Universities (TRUSTINF3)	0.53***	0.54***	1.00	
(4) Libraries and Information Services (TRUSTINF14)	0.49***	0.42***	0.53***	1.00
Mean	3.2	2.3	3.4	3.7
St. dev.	1.2	1.3	1.2	1.0
Min	1	1	1	1
Max	5	5	5	5

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
*** Correlation is significant at the 0.001 level (2-tailed).

the respondents completed secondary education, 21.2% attended higher educational institutions, 20.3% received an academic education, 16.1% hold a postgraduate degree, 15.3% hold a PhD, and a significantly small percentage (1.7%) have only basic education. About 36.4% were employed in medical services (e.g., medical and paramedical staff) and 63.6% in nursing services. About 86.4% work as employees, 11.9% work as supervisors, while a small percentage of 1.7% works as registrars. The average working experience was 12 years and average work time in this position was 7 years.

In Part B of the questionnaire, which collected data in relation to the items used to measure the model factors as well as Internet access, only 8.5% of the respondents claimed having access to the Internet both at home and at work, 39.2% had access only at home, 48.3% only at work, and 8.2% had no access to the Internet whatsoever. Regarding the respondents' frequency of Internet use for information-seeking purposes related to their professional activities, 41.6% of the respondents claimed using the Internet at least once a day, 41.6% several times a week, 9.7% once a week, while the remaining 7.1% claimed not using the Internet at all in order to research information. Additionally, 39% of the respondents use their personal computer to handle software, 33.1% to access their personal web pages, 11.9% for online product orders, 81.4% to research information, 59.3% to send and receive e-mails, and 17.8% to access e-shopping services. The above statistics denotes some homogeneity regarding the use of information sources as well as the education level of the participants in our study.

4. Results

4.1. Analysis method

Having described the general descriptive findings related to the variables in our model, we continue on with validating the theoretical model outlined in Section 2. Validation was done using confirmatory factor analysis (CFA), which allowed us to test whether the theoretical model adequately explains the variance in our data. As a particular application of CFA in our model, we chose to use the partial least squares methodology (Diamantopoulos & Winklhofer, 2001) in order to assess the various hypotheses that were presented previously. Operationalization was done using a reflective model in order to adhere to hypothesis development. Analysis was conducted using Smart PLS (Ringle, Wende, & Will, 2005).

4.2. Assessment of common method bias

Since the questionnaire contained both dependent and independent variable items on the same data collection session, it might be possible that shared variance might inflate the relationships among the variables used in the structural model. Therefore, we need to safeguard against this influence by assessing the bias of common variance (common method bias). Since we are using the PLS methodology to examine the relationships between the variables, we use the common latent factor method suggested by (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Following that approach we assigned all the items in the measurement model to a common latent factor and assessed how much of the variance for each item is explained by the variance of the principal construct. Of all the factor indicators assigned to the latent construct, none was significant at the **($p < 0.01$) level. Therefore our initial concern regarding common variance shared by the items of the measurement model was removed.

4.3. Reliability analysis and descriptive statistics

The inter-item reliability coefficient yielded a Cronbach's alpha of $\alpha = 0.8$, which falls into the acceptable area for consistency (Santos, 1999). Table 1 provides the descriptive statistics

Table 3
Importance of information resources on the workplace.

Importance of information resources at workplace (alpha: 0.77)	1	2	3	4	5	6	7
(1) Personal libraries (INFWORK1)	1.00						
(2) Hospital libraries (INFWORK2)	0.36***	1.00					
(3) Print sources (INFWORK3)	0.22*	0.33***	1.00				
(4) Advice from Colleagues (INFWORK4)	0.14	−0.03	0.23*	1.00			
(5) Scientific journals (INFWORK5)	0.37***	0.39***	0.41***	0.25**	1.00		
(6) Conferences (INFWORK6)	0.28**	0.32***	0.42***	0.28**	0.75***	1.00	
(7) Medical company representatives (INFWORK7)	0.10	0.24*	0.27**	0.40***	0.51***	0.59***	1.00
Mean	3.7	3.1	3.6	4.0	4.0	3.3	3.3
St. dev.	1.2	1.4	1.1	1.1	5.0	1.3	1.2
Min	1	1	1	1	1	1	1
Max	5	5	5	5	5	5	5

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
*** Correlation is significant at the 0.001 level (2-tailed).

Table 4
Motivational factors affecting information needs (Cronbach's reliability index $\alpha = 0.74$), $N = 118$.

Motivational factors affecting information needs (alpha: 0.74)	1	2	3	4	5	6
(1) Scientific developments in your field (MOTF1)	1.00					
(2) Research activities (MOTF2)	0.39***	1.00				
(3) Knowledge updating (MOTF3)	0.33***	0.72***	1.00			
(4) Lifelong learning (MOTF4)	0.23*	0.53***	0.56***	1.00		
(5) Personal interest (MOTF5)	0.37***	0.32***	0.38***	0.53***	1.00	
(6) Uncertainty (MOTF6)	−0.04	0.18	0.24*	0.13	0.25**	1.00
Mean	4.2	3.8	4	4	4.3	3.3
St. dev.	1	1.1	1	1.1	1	1.3
Min	1	1	1	1	1	1
Max	5	5	5	5	5	5

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
*** Correlation is significant at the 0.001 level (2-tailed).

regarding the perceived credibility of different information sources (first column) for the healthcare professionals who took part in our survey as well the pairwise Pearson correlation coefficients and the significance level. As can be seen, respondents seem to consider search engines as more credible with respect to their information needs ($M = 4.3$, SD = 1.1), followed by access to scientific databases ($M = 3.4$, SD = 1.5), specialized electronic journals ($M = 2.9$, SD = 1.3), web pages of public institutions ($M = 2.6$, SD = 1.1.), company web pages ($M = 2.6$, SD = 1.1), and e-books ($M = 2.6$, SD = 1.1). The fact that professionals tend to prefer search engines as more credible than authoritative sources such as medical journals may be attributed to the fact that search engines are used more extensively by doctors than other sources; moreover, authoritative sources may impose access barriers (e.g., subscription fees); hence doctors might relate the frequency of usage and convenience of accessing the desired information with increased credibility for the source.

In relation to the attitude of the respondents concerning the perceived trust of institutional/government information sources (Table 2), it seems that they mostly consider reliable information retrieved from government sponsored libraries and information services ($M = 3.7$, SD = 1.0), followed by information on webpages of universities ($M = 3.4$, SD = 1.2), the Ministry of Health ($M = 3.2$, SD = 1.2), and the Regional Healthcare System. Inter-item reliability measured with Cronbach's alpha coefficient was $\alpha = 0.81$, showing acceptable reliability for this construct (Thompson, 2004).

Table 3 summarizes the descriptive statistics regarding the importance of different information sources for the healthcare professionals in our respondent sample as well the pairwise Pearson correlation coefficients and significance level. Inter-item reliability coefficient was $\alpha = 0.77$ showing low inter-item reliability, probably attributed to the heterogeneity of the sample in relation to their information needs. Electronic sources and colleagues rank first among the respondents' preferences ($M = 4.0$, SD = 1.1), followed by personal libraries ($M = 3.7$, SD = 1.2), print sources ($M = 3.6$, SD = 1.1), scientific journals ($M = 3.3$, SD = 1.3), and conference proceedings ($M = 3.3$, SD = 1.2).

The construct concerning the internal motivational factors affecting information needs of healthcare professionals is presented in Table 4. For this construct the inter-item reliability coefficient was $\alpha = 0.74$. The most important incentives for information seeking were the following: personal interest ($M = 4.3$, SD = 1.0), scientific developments in the respondent's field of expertise ($M = 4.2$, SD = 1.0), lifelong learning ($M = 4.0$, SD = 1.1), and knowledge updating ($M = 4.0$, SD = 1.0). Research activities ($M = 3.8$, SD = 1.1), and feelings of uncertainty ($M = 3.3$, SD = 1.3) rank last.

The construct reliability for the four factors is of an acceptable level to be used in a structural model. Considering the size of the sample ($N = 118$), construct reliability is well above the margin of 0.7, which indicates a good overall fit for the constructs.

4.4. Assessment of structural model

Fig. 2 shows the structural model results of the theoretical model used in the analysis. We performed a bootstrapping procedure with 500 samples in order to examine the significance of each path using t-tests (Götz, Liehr-Gobbers, & Krafft, 2010). We then ran the partial least squares (PLS) algorithm to obtain the path coefficients, and the amount of variance explained by the endogenous constructs. All path coefficients were highly significant ($p < 0.001$) apart from the effect of perceived reliability and personal motivational factors

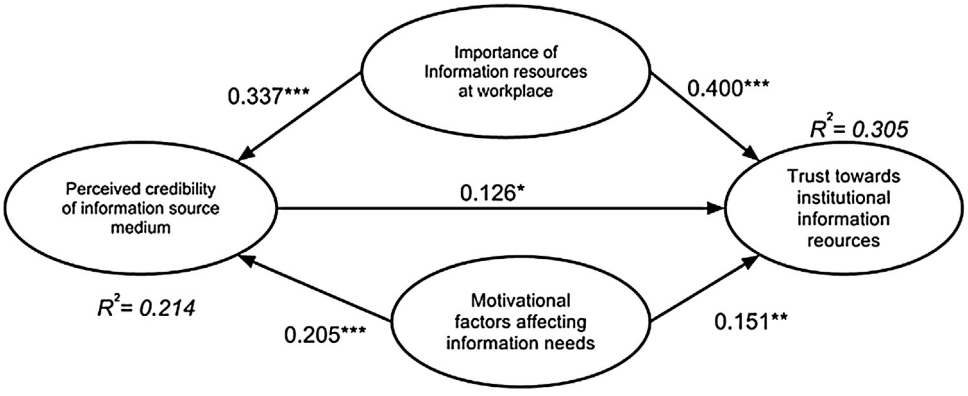

Fig. 2. Validation of the theoretical model, showing the path coefficients and the validation of the bootstrapping procedure. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$, p values show the results of the two-tailed t-test for the path coefficients.

Table 5
Convergent validity and discriminant validity for the constructs in our model. *Note*: bold numbers in the diagonal row are square roots of average variance extracted by construct.

Construct	(a)	(b)	(c)	(d)
Perceived credibility	**0.74**			
Information resources at workplace	0.42*	**0.72**		
Personal motivation	0.35*	0.43*	**0.74**	
Trust toward institutional information	0.35*	0.52*	0.36*	**0.8**
AVE	0.55	0.52	0.55	0.64
CR	0.83	0.82	0.80	0.87

* Correlation significant at $p < 0.01$ level.

on perceived trust, which had a marginally lower significance level ($p < 0.01$).

For the dependent variable in our model (TRUST), the R^2 value of 0.3 indicates that the model is able to explain a good amount of the variance related to trust toward institutional information resources as explained by the influence of perceived credibility of the information resources, and the influence of work related and personal motivation factors on information seeking. In addition, the perceived credibility of the information sources, as explained by the influence of work related and personal motivation, explains an adequate amount of the variance ($R^2 = 0.214$). The relation between perceived credibility and trust toward institutional resources alone is significant at $p < 0.01$.

Overall the model confirms the hypothesized relations. Both convergent validity and discriminant validity provide support for the validity of the results. Table 5 shows the results of the validity analysis. Convergent validity (CR) and average variance extracted (AVE) as well as the pairwise correlations between the constructs with the diagonal showing the squared root of the average variance extracted.

Overall the fit of the model in respect to the constructs is within the guidelines of the PLS literature with composite reliability (CR) being greater than 0.6 and average variance extracted (AVE) being above 0.5 (Bagozzi & Yi, 1988).

We discuss the findings of the model validation as well as the qualitative results in relation to the descriptive analysis of the constructs in the section that follows.

5. Conclusions and discussion

We developed a model that measures the perceived credibility and trust of medical information under the auspices of professionals' work-related information needs and available information sources. Overall, the model confirms the relation between perceived credibility and trust toward information resources. While this is expected for traditional information resources, in our study it was interesting to examine whether this effect is confirmed when taking into account the special nature of the information resources under examination, which has to do with government sponsored institutional information such as guidelines and assessments provided by regulatory authorities.

Specifically, work related factors seem to have a higher impact on perceived credibility and trust toward institutional information sources than personal motivation factors. This can be attributed to the nature of the information per se, since it has to do with compliance with work-related standards and intrinsic motivation effects are difficult to observe in such cases.

On the other hand, the effect of work related factors explicitly shows that stimulating information availability at work, results in higher acceptance of work-related institutional information since compliance with government regulated standards (as depicted in institutional information sources) is mostly enforced rather than followed voluntarily (Cannoy & Salam, 2010). Such an issue needs also to be addressed from the perspective of information overload, whether the need for "updating" becomes substantially costly when the frequency of information dissemination is higher (e.g., the publication of new standards and regulations every few months). To that extent personal motivation for information seeking and knowledge updating is also an important factor to consider in overcoming possible information overload scenarios in the pursuit of compliance.

To our knowledge, this study is the first that attributes the selection of workplace information resources by medical professionals to their perceptions of credibility and trust toward them. Indeed, extant studies that investigate the information seeking behavior of doctors reveal that professionals tend to prefer sources that reside in their workplace (Clarke et al., 2013; Davies & Harrison, 2007). Although this behavior has been attributed to the increased level of familiarity and convenience that such sources entail, our research provides an additional in-depth insight regarding the selection of workplace information sources compared to external ones such as the Internet. Interestingly enough, our findings indicate that credibility and trust are equally strong information behavior factors both in controlled information environments, such as the workplace, and in the case of uncontrolled environments (e.g., the Internet) (Corritore, Wiedenbeck, Kracher, & Marble, 2012). To this end, our findings may inform the development of trust building and assessment frameworks that evaluate the current degree of credibility and trustworthiness for workplace information sources and outline pertinent strategies to strengthen them.

The issues of information credibility and trust elaborate and develop a more holistic approach in considering information behavior perspectives for doctors. This involves sense-making related to the impact of "trusted" and "credible" information in clinical decision making, and toward a wide range of other work related tasks (e.g., research, training). The purposive information behavior in healthcare is ultimately assessed by the differences achieved in clinical outcomes when credible information is made available and used by doctors. In turn, sound decisions for diagnostic and therapeutic interventions should lead to better long term prognosis as well as enhanced patient involvement. The reduction of uncertainty in healthcare related decisions includes an array of complex processes, emotions, and attitudes involving the patient, as well as behaviors toward information resources and information exchange with colleagues. Indeed, doctors tend to collaborate and consult doctors who are more likely to provide trusted and credible information. A new role is emerging for medical doctors who act as trusted and credible information resources for patients. Trusted and credible information interchange between the doctors and patients encourages the establishment of a collaborative environment for information sharing and exchange.

We also suggest that our research provides a partial explanation of doctors' behavior toward government sponsored information sources such as medical guidelines and protocols. Guidelines and protocols provide the *de facto* and allowable rules of clinical practice for medical professionals. Nevertheless, evidence suggests that doctors frequently fail to follow clinical practice because they raise concerns regarding (a) their applicability to unique patient cases, (b) their capability of providing individualized treatment, and (c) their degrees of freedom for professional discretion (Carlsen & Bringedal, 2011; Swennen et al., 2013). Hence, doctors often rely on 'unwritten rules' for clinical practice that are suggested by their peers (McDonald, Waring, Harrison, Walshe, & Boaden, 2005). This behavior may be explained through the lenses of credibility and trust. Indeed, doctors may select to follow practices that have been proven to work and are recommended by sources that they trust and they consider credible. Such practices, though not included strictly in the portfolio of medical guidelines and protocols, may,

in turn, be followed because professionals trust their applicability and efficiency in practice.

While the sample size is somewhat limited with respect to making generalizations from this study, especially as the situation among the staff of one hospital in Greece is likely for a variety of reasons to be different from other hospitals and countries, a future study could take a cross-cultural stance or include a more representative sample of hospitals in one country. A particular issue to consider here would be whether work-type relation (a private funded clinic vs. a public funded clinic) would yield different results, concerning the perceived reliability and perceived trust toward the government-sponsored information, since being employed in a public funded clinic means more directly complying with government guidelines.

Finally, healthcare information in an organizational context traditionally gives the role to healthcare libraries to provide credible information of high quality to medical professionals. The effective operation of healthcare units should arguably be based on accurate, timely, and relevant information and data exchange. This may be achieved with the provision of effective Internet services so as to satisfy specialized queries and the smooth operation of hospital libraries. On the other hand the continuous assessment of the collection of a hospital library from the perspective of the user can provide additional insights into which types of information resources are preferred by the users (Kostagiolas, Korfiatis, & Poulos, 2012; Kostagiolas, Samioti, Alexias, Korfiatis, & Niakas, 2012). In fact, the healthcare information professionals and clinical librarians may come to the rescue when credible information is urgently required within a clinical setting. This fact, may give rise to a novel research perspective toward collaborative information behavior in healthcare, involving information sharing and exchange within the knowledge intensive clinical workplace.

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