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Perceived environmental uncertainty and digital maturity in primary healthcare facilities in the UK: implications for job satisfaction and organizational trust

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Liliana Hawrysz, Anna Zabłocka-Kluczka, Katarzyna Żak and Hajra Karahodzic

Wrocław University of Science and Technology, Wrocław, Poland

Abstract

Purpose – This study aims to examine the perceived environmental uncertainty of primary care managers in the UK and its impact on the digital maturity of primary care facilities as well as the connection between digital maturity, managerial job satisfaction and organizational trust.

Design/methodology/approach – We conducted the study in the second quarter of 2023, surveying 200 managers from primary healthcare facilities in the UK. We conducted the survey using the computer-assisted web interview (CAWI) method based on a purchased panel of respondents. We analyzed the data using descriptive statistics and structural equation modeling (SEM).

Findings – Perceived environmental uncertainty significantly and positively influences digital maturity. Furthermore, we observed a positive relationship between digital maturity and managerial job satisfaction as well as between managerial job satisfaction and organizational trust. Organizational trust results from the direct impact of managers' satisfaction and the level of an organization's digital maturity as well as from the indirect impact of digital maturity and perceived environmental uncertainty.

Originality/value – The study expands the existing knowledge in contingency theory by emphasizing the substantial influence of trust on an organization's long-term stability and the well-being of its members. Moreover, it underscores the significant impact of digital maturity on managers' job satisfaction and organizational trust, as outlined in sociotechnical theory.

Keywords Perceived environmental uncertainty, Primary healthcare, Digital maturity, Managerial job satisfaction, Organizational trust

Paper type Research article

Introduction

The impact of digital technologies on healthcare has received considerable attention, particularly in relation to both internal factors, such as perceived credibility and relative advantage, and external factors that influence organizational adoption (Khalifa & Shen, 2008; Chen & Zhang, 2016). According to contingency theory, organizations must account for external factors to optimize internal operations (Bhatt, 2000; Pérez-Aróstegui, Bustinza-Sánchez, & Barrales-Molina, 2015). Environmental uncertainty is one of the most significant external factors. It plays a crucial role in influencing managerial planning and decision-making (Lueg & Borisov, 2014). Research shows that uncertainty can shape management practices, decision-making processes, and overall organizational performance (Besson, Löning, & Mendoza, 2008; Burkert & Lueg, 2013). Furthermore, scholars have widely examined environmental uncertainty as a moderator

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in management studies, illustrating its centrality as an unpredictable and influential factor in strategic decision-making (Milliken, 1987; Andrews, 2008). While researchers have applied contingency theory across diverse sectors, including healthcare, this study presents an original contribution by focusing on primary healthcare (PHC) facilities in the UK. Previous applications often lacked a clear differentiation of healthcare contexts or a specific focus on the intersection of digital healthcare transformation and environmental uncertainty. By situating this research within the distinct operational challenges of PHC in the UK – a sector underpinned by the enduring crisis of the National Health Service (NHS) – we provide a nuanced exploration of how perceived environmental uncertainty (PEU) informs digital maturity (DM), organizational trust (OT), and job satisfaction (SAT). This targeted approach distinguishes the study from broader applications of contingency theory by examining how digital transformation offers strategic responses to the compounded uncertainties unique to the UK healthcare system. Many have described the UK healthcare system as being in a perpetual state of crisis since the founding of the National Health Service (NHS) in 1948 (Abbasi, 2017). Greener and Powell (2024) identifies five primary crises facing the NHS: funding, workforce shortages, healthcare restructuring, patient safety, and pressure on services (particularly during winter months). Compounding these issues is the post-Brexit health security relationship between the UK and the European Union, which has exacerbated staffing shortages and organizational challenges (Glencross, 2020). These multifaceted crises create significant sources of uncertainty for PHC managers, complicating their strategic decision-making and operational practices (Fisher, Croxson, Ashdown, & Hobbs, 2017). Scholars argue that managers make strategic choices based directly on their perceptions of environmental conditions (Andrews, 2008). Miles, Snow, Meyer, and Coleman (1978) organizational theory emphasizes that an organization's performance is closely tied to how well it aligns with its external environment. Successful strategy implementation is often contingent upon managers' ability to interpret and respond to environmental uncertainty (Miles *et al.*, 1978; Shatem & Abou-Moghli, 2024). These perceptions result from external complexity and unpredictability, and they can outweigh the importance of objective environmental factors in guiding managerial decisions (Weick, 1979; Hammad, Jusoh, & Ghozali, 2013). For managers in healthcare settings, particularly those in the UK dealing with the ongoing crisis, perceived uncertainty is likely to be heightened, leading to a greater emphasis on strategic scanning and adaptation to external pressures (Jurkovich, 1974). Organizations buffer against environmental uncertainty primarily by adopting digital technologies (Abu-Rahma & Jaleel, 2019). The process of digital transformation has affected organizations across all sectors (Kedziora & Kiviranta, 2018). It reshapes work environments and organizational dynamics, influencing employees' experiences, job satisfaction, and trust (Lambert *et al.*, 2021a, Lambert, Tewksbury, Otu, & Elechi, 2021b).

Our study examines the implications of digital transformation in PHC settings in the UK, addressing the largely unexplored interplay between PEU and DM, especially in the post-pandemic context. The COVID-19 pandemic has accelerated the implementation of digital technologies within PHC settings (Pagliari, 2021), introducing new dimensions of uncertainty related to work relationships and organizational dynamics. This study positions itself within the emerging body of literature on digital healthcare transformation, emphasizing its specific contributions to the management discourse within the UK healthcare system. While previous research has highlighted the importance of PEU in driving DM in healthcare, particularly in relation to improving patient outcomes and reducing costs (Berwick, Nolan, & Whittington, 2008), there remains a significant gap in understanding the experiences of PHC facilities. As the COVID-19 pandemic has accelerated the implementation of digital technologies within PHC settings (Pagliari, 2021), it has also introduced new dimensions of uncertainty related to work relationships and organizational dynamics. This emerging landscape underscores the need to examine the impact of PEU on DM in PHC facilities, as well as its implications for SAT and OT. We aimed to explore the relationship between PEU, DM, SAT, and OT in the context of PHC facilities in the UK. Specifically, we sought to understand how PEU influences DM and how DM affects SAT and trust within these organizations. Despite the growing body of

literature on DM in healthcare, scholars have paid little attention to the role of PEU in shaping digital adoption and its broader organizational implications. This study adopts a sociotechnical approach to offer new insights into how digital technologies are reshaping PHC environments, focusing on the views of healthcare managers. The remainder of this article has the following structure: Section 2 reviews the relevant literature and outlines the research hypotheses; Section 3 describes the research methodology; Section 4 presents the analysis results; and Section 5 discusses the findings and concludes the study.

Literature review

Advocates of healthcare digitalization emphasize its potential to address twenty-first-century challenges by offering more affordable, safer, and accessible care. Policymakers argue that digital solutions can be as effective and patient-centered as traditional care. To address the ongoing "crisis" in primary care, patients and healthcare providers have widely embraced services such as remote consultations, monitoring, and self-management, along with digital systems for scheduling appointments, ordering prescriptions, and accessing electronic health records (Ziebland, Hyde, & Powell, 2021). Investments in digital technologies enable primary care facilities to better manage challenges resulting from uncertain environments, and as was evident during the COVID-19 pandemic, these technologies are essential for maintaining business continuity in the healthcare sector (Gifford *et al.*, 2022). Uncertainty is a key contextual factor influencing decision-making (Sniazhko, 2019). Milliken (1987) notes that environmental uncertainty arises from individuals' inability to foresee the direction and impact of environmental changes on their organizations. High levels of uncertainty are often associated with heightened risks, potentially leading to severe consequences from poor decision-making. This perception can elevate stress and anxiety among managers and employees, eroding confidence in decision-making processes (Waldman, Ramírez, House, & Puranam, 2001). As perceived environmental uncertainty (PEU) increases, so does the need for organizations to engage in its active management. Simangunsong *et al.* (2012) identifies two primary strategies for managing uncertainty: reduction and coping. Uncertainty reduction involves gathering information, fostering collaboration, and expanding networks, while coping strategies include shaping flexibility, imitating successful models, and reactive collaboration. Digital technologies offer critical tools for reducing uncertainty by providing swift access to key information, enabling more informed decision-making as a result (McDermott, 2010). However, uncertainty also presents opportunities for long-term strategic growth, as Li and Li (2010) demonstrate. Noteworthy, PEU, particularly regarding resource orchestration, plays a significant role in digital transformations, fostering the need for increased operational efficiency, cost reduction, and improved patient outcomes (Chen & Tian, 2022). In this context, DM serves as a crucial mechanism for coping with PEU. Although DM lacks a universally accepted definition, its general understanding is the extent to which digital systems are used to improve healthcare services, enhancing patient care and patient experience (Duncan, Eden, Woods, Wong, & Sullivan, 2022). Moreover, DM involves not only adopting new technologies but also upskilling staff, reshaping organizational processes, and fostering cultural shifts toward greater adaptability in PEU (Chanias & Hess, 2016). Organizations with higher DM are better equipped to manage PEU, displaying greater flexibility and quicker adaptation to changes, such as those resulting from new regulations or health policies (Chen & Zhang, 2016). This research examines how these dynamics unfold in PHC facilities, highlighting the importance of DM in responding to the specific challenges of the healthcare environment in the UK. By situating this research within the UK context and aligning it with the broader literature on digital healthcare transformation, this study advances the understanding of how contingency theory can inform strategic decisions in healthcare. The study's originality lies in its emphasis on the interplay between PEU and DM in PHC, addressing the gaps in the existing literature and offering a fresh perspective on the organizational implications of digital transformation in a post-pandemic world.

H1. PEU among primary care managers is positively correlated with the DM of PHC facilities.

Organizational trust (OT) reflects employees' confidence that, despite their limited influence over decision-making, the organization will act in their best interest or at least avoid causing them harm. Employees, therefore, accept a certain level of vulnerability regarding actions beyond their control (Hayunintyas, Do, Sudiro, & Irawanto, 2018). Trust, whether interpersonal or inter-organizational, often faces constraints from cultural differences and limited experience in collaborative interactions (Blomqvist & Ståhle, 2012). This study defines OT as the positive expectations of individuals in regard to the intentions and behaviors of various organizational roles, relationships, and interactions (Shockley-Zalabak, Ellis, & Winograd, 2000). Several studies indicate that digitalization significantly alters both organizations and their work environments, impacting trust dynamics within them (Manyika *et al.*, 2016; Kedziora & Kiviranta, 2018). Digital transformation shapes how organizations interact internally and externally, influencing trust at both societal and organizational levels. PHC facilities face challenges in adapting to the disruptive changes associated with digitalization, requiring a shift in organizational routines and structures to align with the needs of the digital age (Berghaus & Back, 2016). Successful digital adoption can create a more supportive environment for employees by streamlining workflows, enhancing data accessibility, and integrating technology to improve work processes (Ramachandran, Brinton, Wiljer, Upshur, & Gray, 2023). Traditional PHC facilities recognize the necessity of embracing digital solutions to provide more efficient, cost-effective, safer, and higher-quality care (Carvalho, Rocha, & Abreu, 2016). However, the literature provides limited insight into how an organization's DM influences OT. Some research suggests that digitalization, particularly in the context of the Fourth Industrial Revolution, has shifted trust from personal relationships to system-based trust (Lumineau, Schilke, & Wang, 2023). The increasing reliance on digital systems introduces new challenges, such as uncertainty regarding the system's designers, data quality, and the ownership of sensitive information (Jakku *et al.*, 2019). Nevertheless, as digital technologies become more pervasive, trust in data flows and analytics is also evolving (Fielke, Taylor, & Jakku, 2020). This study posits that greater DM enables organizations to better adapt to change, thereby fostering stronger OT (Ramachandran *et al.*, 2023). Consequently, institutions with higher DM may experience more stable levels of trust.

H2. The DM of PHC facilities is positively correlated with OT.

Job satisfaction (SAT) is often defined as an individual's overall emotional response to their job (Cijan, Jenič, Lamovšek, & Stemberger, 2019). The relationship between DM and SAT is complex, involving both opportunities and challenges (Bolli & Pusterla, 2022). SAT is a key indicator of how well employees' professional values align with their work, particularly alongside the introduction of digital technologies (Yi *et al.*, 2022). Research by Bolli and Pusterla (2022) and Cijan *et al.* (2019) highlights the advantages of digitalization, such as increased productivity, enhanced job roles, improved interpersonal relationships, and more flexible operational models (Waheed, 2010). Digitalization is reshaping workplaces across various industries, including primary healthcare, where it is significantly affecting work processes, job characteristics, and workloads. However, researchers have paid limited attention to the impact of DM on SAT, particularly in healthcare. Most discussions focus on the implementation of digital tools rather than their maturity. Employees often perceive digitalization as a source of stress, as they must continuously update their skills to keep pace with technological advancements, which can lead to a more intense work environment (Bregenzer & Jimenez, 2021). Contrary to these challenges, recent findings suggest that SAT may improve as digital systems mature and employees become more familiar with these systems (Turja, Särkikoski, Koistinen, Krutova, & Melin, 2024). Moreover, well-developed digital solutions can reduce workload, though inadequate digitization may exacerbate stress, particularly in healthcare (Sommer, Schmidbauer, & Wahl, 2024). Thus, exploring the influence of DM on SAT is essential.

H3. The DM of PHC facilities is positively correlated with SAT.

SAT, a key organizational outcome of human resource management (HRM), is strategically significant for organizations (Top, Tarcan, Tekingündüz, & Hikmet, 2013). Researchers have often examined SAT as a variable closely linked to organizational outcomes, with numerous studies demonstrating correlations between SAT and key performance indicators such as organizational performance, employee turnover, commitment, and trust (Top *et al.*, 2013). One crucial element for organizational success is trust, particularly OT, which is associated with higher levels of employee satisfaction and productivity (Top *et al.*, 2013). Building OT is a challenge that significantly impacts industries like healthcare, where the quality of care may have close ties to the level of trust employees have in their organization. Consequently, it is essential to investigate which organizational behaviors or processes foster trust and enhance performance (Bijlsma-Frankema, de Jong, & van de Bunt, 2008). In the healthcare sector, where innovation and change are constant, OT can serve as both a constraint and a catalyst for achieving desired outcomes. Therefore, HRM practices and management strategies must focus on cultivating and maintaining strong relationships within the organization (Six & Skinner, 2010). Efforts to enhance SAT and promote a culture centered on employee well-being can lead to increased OT (Top *et al.*, 2013). While prior studies have explored the mediating role of organizational commitment in the relationship between SAT and OT (Zaresani & Scott, 2020; Klus & Müller, 2021), there is a need to examine the direct influence of SAT on OT.

H4. SAT is positively correlated with OT.

Material and methods

Data collection and respondent characteristics

The findings of this study form a part of a broader research project addressing the issue of fostering engagement among managers of primary healthcare (PHC) facilities (Hawrysz, Kludacz-Alessandri, Kluczka, & Żak, 2024a; Hawrysz, Zabłocka-Kluczka, Fiałkowska-Filipek, & Żak, 2024b). We conducted the survey during the second quarter of 2023, utilizing the computer-assisted web interview (CAWI) method with a purposive panel comprising 200 high-level managers employed in PHC facilities. We surveyed under the supervision of a certified survey company, with stringent quality control measures in place. The term "purposive panel" refers to a pre-identified panel comprising high-level managers employed in primary healthcare (PHC) facilities who met the specific inclusion criteria for our study. We acquired this panel through a purchased respondent panel service, meaning that the survey company provided access to a curated group of qualified respondents meeting the eligibility requirement (holding a managerial position in a PHC facility). From this panel, we randomly selected 200 managers and invited them to participate in the survey. In cases where selected managers declined participation, we implemented a substitution process: we randomly selected additional managers from the same panel to replace those who had refused, thereby maintaining the intended sample size and preserving the random selection approach. We designed this two-stage procedure to minimize selection bias and to obtain complete responses from 200 managers. Regarding geographic distribution, we drew managers in the sample from PHC facilities located across diverse regions of the UK, including both urban and rural areas. The sampling strategy aimed to avoid geographic concentration, thereby reducing the risk of location bias. To ensure the anonymity of participants and adherence to privacy principles, we chose the CAWI method, alongside a purchased respondent panel. All participants provided informed consent prior to taking part in the study. We obtained this consent through the following declaration: "I hereby declare that I, of my own free will, agree to participate in this study, and I understand that I may withdraw at any time without providing a reason and without facing any consequences." Providing consent was a prerequisite for continuing with the questionnaire. To address potential common method bias, we implemented several procedural

remedies. These included the use of reverse-coded items and the randomization of items from different constructs within the survey. Furthermore, we assessed the presence of common method bias through Harman's one-factor test, which revealed that the first factor accounted for 49.37% of the total variance, falling below the commonly accepted threshold of 50%. Thus, common method bias does not pose a significant threat to the validity of this study. The Committee for Research Ethics of Wrocław University of Science and Technology reviewed both the questionnaire and the research procedures from an ethical standpoint, granting a Certificate of Ethics Approval (Certificate dated April 7, 2023, No. O-23-11). We divided the questionnaire into two sections. The first section gathered information on managers' characteristics, including sociodemographic data (age, gender, education, and managerial experience), while the second section contained questions designed to collect detailed information on the key constructs under study, such as perceived environmental uncertainty (PEU), digital maturity (DM), job satisfaction (SAT), and organizational trust (OT). Table 1 presents the sociodemographic characteristics of the participants.

The sample consisted predominantly of women, accounting for 71.4% of the respondents. A significant portion of the surveyed were relatively young managers, with 35.5% aged between 35 and 44 years, and 32.5% aged between 25 and 34 years. In terms of educational background, the majority of participants (56%) held medical qualifications, while nearly 40% had backgrounds in business, management, or administration. Concerning managerial experience, the sample was primarily composed of individuals with limited experience, as 48% had held managerial positions for up to five years. The average duration of managerial experience among the respondents was slightly over eight years. The participants represented primary healthcare facilities of varying sizes. The largest facility employed 4,289 general practitioners (GPs), while the average number of GPs employed across the sample was 86. This demographic information provides valuable insight into the composition of the sample and enhances the understanding of the study population.

Research variables description

We developed the survey questionnaire following a comprehensive review of the relevant literature, intending to verify the proposed hypotheses through constructs such as PEU, DM, SAT, and OT.

Table 1. Demographic and socioeconomic characteristics of respondents

Characteristics	Classification	*n*	%
Gender	Female	142	71.4
	Male	56	28.1
	Other	1	0.5
Age	18–24	11	5.5
	25–34	65	32.5
	35–44	71	35.5
	45–54	33	16.5
	55–64	20	10
	65+	0	0
Educational background	Medical background (e.g. doctors, nurses, midwives)	112	56
	Business, management and administrative background	78	39
	Other	10	5
Experience in a managerial position	1–5	96	48
	6–10	45	22.5
	11–20	40	20
	21 years or more	11	5.5
	No answer	8	4

Source(s): Authors' own elaboration

We measured PEU using an adapted version of the construct developed by Waldman *et al.* (2001), who defined PEU as the extent to which decision-makers perceive their organization's external environment as unstable, complex, or difficult to predict, particularly in terms of technological, economic, and market-related changes. In our study, we simplified and contextualized the PEU measure for use in the UK primary care setting. We used two items to assess this construct. These two items capture different dimensions of environmental change: turbulence and opportunity-driven expansion, both of which contribute to PEU.

To assess DM, we employed a modified version of the Deloitte digital maturity model, which we tailored to primary care facilities. This model includes five dimensions: Strategy, Technology, Operations, Organization and Culture (treated as a single dimension), and Patient, offering a holistic assessment of an organization's digital maturity. The original Deloitte model featured a "Customer" dimension, which we replaced with "Patient" to align with the healthcare context. Although Schumacher, Erol, and Sihn (2016) propose a similar maturity model with nine dimensions, we focused on the five Deloitte dimensions as they aligned better with our research objectives. We asked respondents to rate their organization's maturity in each of these dimensions using questions we adapted from Herceg, Kuč, Mijušković, and Herceg (2020), who also utilize the Deloitte framework. Unlike Herceg *et al.*'s (2020) 100-point scale, we opted for a 7-point Likert scale to enhance accessibility and ease of response for participants.

In this study, we derived the concept of OT from the work of Shockley-Zalabak *et al.* (2000), which defines OT as the extent to which individuals hold positive expectations regarding the intentions and behaviors of various organizational members. These expectations result from the roles, relationships, experiences, and interdependencies within the organization. Shockley-Zalabak *et al.* (2000) developed a five-dimensional construct of OT, encompassing concern for employees, competence, identification, reliability, and openness/honesty. The *encompassing concern for employees* dimension assesses employees' perceptions of how much supervisors care about their well-being, listen to their concerns, and communicate with honesty. This dimension reflects the extent to which leadership demonstrates empathy, support, and respect in everyday interactions. The *competence* dimension reflects employees' overall satisfaction with the organization's effectiveness, service quality, goal achievement, and staff capabilities. This dimension captures perceptions of the organization's ability to perform successfully and meet its expectations. The *identification* dimension captures the degree to which employees feel a sense of connection and shared values with their peers, supervisors, and the organization as a whole. This dimension reflects emotional attachment, the alignment of values, and a sense of belonging within the organizational environment. The *reliability* dimension assesses employees' perceptions of supervisors' consistency, dependability, and follow-through. The dimension reflects the extent to which organizational leaders fulfill promises and act in a predictable and trustworthy manner. The *openness/honesty* dimension reflects the degree to which communication within the organization is transparent, respectful of differing opinions, and inclusive of employee inputs. This dimension captures employees' perceptions of informational access, trust in leadership, and freedom to express concerns without fear of negative consequences. We assessed OT through responses we obtained from managers of primary healthcare facilities, basing this methodological choice on their role as principal organizational informants (Kumar, Stern, & Anderson, 1993) and their integral involvement within the organizational framework of the entities under examination. Managers in these facilities not only fulfill supervisory responsibilities but also actively engage in daily organizational operations, maintaining continuous interaction with both staff and higher-level management. Organizational members who are frequently subordinate to other managers are well-positioned to evaluate the organizational climate, including the degree of trust in the organization. We conducted the measurement using a scale we developed in accordance with the extant literature (Shockley-Zalabak *et al.*, 2000; Mayer & Gavin, 2005), and we applied a Cronbach's alpha coefficient of 0.935 to substantiate its reliability.

We measured the level of SAT using Wanous, Reichers, and Hudy's (1997) single-item scale, which asks, "All things considered, how satisfied would you say you are with your job?" Although researchers often discourage single-item measures for psychological constructs because of reliability concerns, prior studies have demonstrated their effectiveness in cases when respondents can easily understand well-defined constructs (Sackett & Larson, 1990). In this case, overall job satisfaction fit these criteria (Wanous *et al.*, 1997). The literature frequently conceptualizes SAT as a critical organizational outcome of human resource management (HRM) practices, which employees typically evaluate. However, we contend that managerial job satisfaction is an equally significant organizational outcome, particularly within the context of primary care, where managers play a crucial role in resource coordination, staff support, and digital strategy implementation. Their job satisfaction can impact both operational effectiveness and organizational climate and thus warrants attention within the broader HRM discourse. The literature acknowledges that managerial well-being, including job satisfaction, serves not only as a personal outcome but also as an indicator of organizational health (Kuoppala, Lamminpää, Liira, & Vainio, 2008; Skakon, Nielsen, Borg, & Guzman, 2010). Satisfied managers are more likely to demonstrate supportive leadership behaviors, reduce turnover, and promote positive employee outcomes, thereby rendering their own job satisfaction indirectly consequential to the organization as a whole.

The study utilized a methodology where we gathered data related to both individual- and organizational-level constructs at the individual level, specifically from managers operating in primary care settings. We conceptualized the constructs of PEU and SAT as individual-level constructs, directly reflecting the personal experiences and perceptions of the respondents. Conversely, we regarded DM and OT as organizational-level constructs. However, we evaluated them based on managers' subjective perceptions of their respective organizations' functioning. This key informant approach (Kumar *et al.*, 1993), wherein respondents provide insights into both their own attitudes and organizational characteristics, aligns with established practices in organizational research, particularly in healthcare contexts. The approach facilitates the collection of informed judgments from individuals who are well-positioned to observe and assess organizational phenomena. The integration of variables from distinct levels of analysis, such as individual and organizational constructs, is a well-established methodology in organizational research. This approach is particularly valuable when the objective is to capture the complexity of phenomena that occur concurrently at both individual and organizational levels. This facilitates a more comprehensive understanding of the interaction between individual attitudes or perceptions and the organizational context in which individuals function. Molina-Azorín, Pereira-Moliner, López-Gamero, Pertusa-Ortega, and José Tarí (2020) underscore the significance of multilevel research, asserting that a combination of variables from different levels can yield a more profound and realistic comprehension of organizational dynamics. The authors emphasize that while this approach necessitates a robust theoretical foundation and meticulous methodological design, it has firm support within the literature on management and organizational sciences. Costa *et al.* (2013) argue that researchers can collect data at the individual level and validly use it to assess organizational-level constructs, as long as they provide appropriate justification, and vice versa. Chang, Liu, Hsieh, and Chen (2020) and Hsieh (2013) further exemplify the practical application of multilevel analysis, wherein researchers examine individual- and organizational-level variables jointly to comprehend their combined effect on job satisfaction. While the integration of variables from different levels of analysis may not represent the most conventional analytical model, this practice is well-documented and increasingly accepted in the academic literature, particularly within the domains of organizational studies (Costa *et al.*, 2013).

We measured all constructs in this study using a 7-point Likert scale, ranging from "strongly disagree" to "strongly agree," with a neutral midpoint of "neither agree nor disagree."

Descriptive statistics, reliability analysis of scales, and the measurement model fit

As an initial step in the analysis, we evaluated the internal consistency of the responses for all research variables. We conducted the analysis using the statistical software package SPSS v. 28. Table 2 presents the results of the Cronbach's alpha analysis. For all examined variables, Cronbach's α exceeded the threshold of 0.7, indicating a high level of internal reliability for the scales and measurements. Specifically, the scale measuring PEU demonstrated good internal consistency ($\alpha = 0.750$), while the scales assessing DM and OT exhibited excellent internal consistency ($\alpha = 0.863$ and $\alpha = 0.935$).

We conducted a confirmatory factor analysis to assess the constructs' validity and test the model fit (Table 3). All constructs displayed high composite reliability (CR > 0.7), indicating that all constructs were reliable. The average variance extracted (AVE) for all constructs exceeded the required 0.5 and in all cases was smaller than CR. The standardized factor loadings of all operational items exceeded the proposed minimum level of 0.5, and all were statistically significant. This indicated the convergent validity of the constructs. In all cases, AVE exceeded the maximum shared variance (MSV), which also indicated the discriminant validity of the scales. We achieved theoretical validity by establishing convergent and discriminant validity for all constructs. The measurement model fit was good (the incremental fit indices such as CFI = 0.985, NFI = 0.959, TLI = 0.979 were above 0.9, and the RMSEA indicator equaled 0.050, $\chi^2 = 79.890$; df = 53; $p = 0.010$; χ^2/df = 1.507).

Results

As the second step of the research, we conducted path analysis using IBM SPSS AMOS v. 28 to verify the theoretical model and test hypotheses H1–H4. We constructed the model with PEU as

Table 2. Defined variables along with the results of the reliability analysis of scales

	No. of items	Cronbach's A	Factor analysis (%)	M	S.D.
PEU	2	0.750	79.98	4.840	1.361
DM	5	0.863	64.96	5.175	1.105
OT:	5	0.935	80.04	5.100	1.208
Concern for employees (CFE)	7	0.920	82.36	5.095	1.391
Competence (COM)	4	0.898	88.89	4.881	1.394
Identification (IND)	5	0.895	82.60	5.244	1.260
Reliability (R)	4	0.901	89.13	5.113	1.443
Openness/honesty (OPE)	9	0.924	72.59	5.163	1.284
SAT	1	–	–	5.245	1.472

Source(s): Authors' own elaboration

Table 3. CFA results for constructs in the examined theoretical model

	CR	AVE	MSV	ASV	OT	DM	PEU
OT	0.970	0.866	0.486	0.328	0.931		
DM	0.869	0.572	0.486	0.353	0.697	0.756	
PEU	0.766	0.625	0.147	0.083	0.209	0.384	0.791
SAT	–	–	0.454	0.312	0.674	0.652	0.238

Note(s): $\chi^2 = 79.890$; df = 53; $p = 0.010$; χ^2/df = 1.507; RMSEA = 0.050; CFI = 0.985; NFI = 0.959; RMR = 0.078; TLT = 0.979; GFI = 0.944; AGFI = 0.904

Source(s): Authors' own elaboration

the independent variable, DM and OT as mediating variables, and SAT as the dependent variable. Given the sample size limitation ($n = 200$), we simplified the hierarchical variable OT by reducing it to metafeatures that captured the complexity of the constructs. This modification helped streamline the model and limit the number of degrees of freedom. The final model included thirteen observable variables and three latent variables. We tested several models during the research process, and the introduction of correlated measurement errors led to the development of a statistically significant and well-fitting model ($\chi^2 = 81.388$; df = 55; $p = 0.012$). Table 4 provides a summary of the model fit indices, while Figure 1 depicts the final structural model.

Table 5 (measurement model), Table 6 (structural model), and Table 7 (total, direct, and indirect effects) present the calculated regression coefficients for both the measurement and structural model, as well as the effects (total, indirect, and direct) within the model.

The results allow for the formulation of conclusions that constitute the basis for the verification of the proposed set of hypotheses and the theoretical model. The regression coefficients, which we can see in Tables 5 and 6 and which determine the importance of each relationship within the model, demonstrate that all assumed variables were statistically significant elements of the model. The total, indirect, and direct effects presented in Table 7 show that each of these variables contributed positively in its own way to the influence of perceived environmental uncertainty on organizational trust. The results describing the path

Table 4. Summary of model fit indices for the structural model

Model fit index*	χ^2/df	GFI	AGFI	RMSEA	CFI	NFI	TLI	Hoelter.05
Results	1.480	0.944	0.907	0.049	0.986	0.958	0.980	180
Recommended value	<5	>0.9	>0.9	<0.08	>0.9	>0.9	>0.9	<200

Note(s) *GFI – Goodness-of-Fit Index; AGFI – adjusted GFI; RMSEA – root-mean-square error of approximation; CFI – Comparative Fit Index; NFI – Normed Fit Index; TLI – Tucker-Lewis coefficient

Source(s): Authors' own elaboration

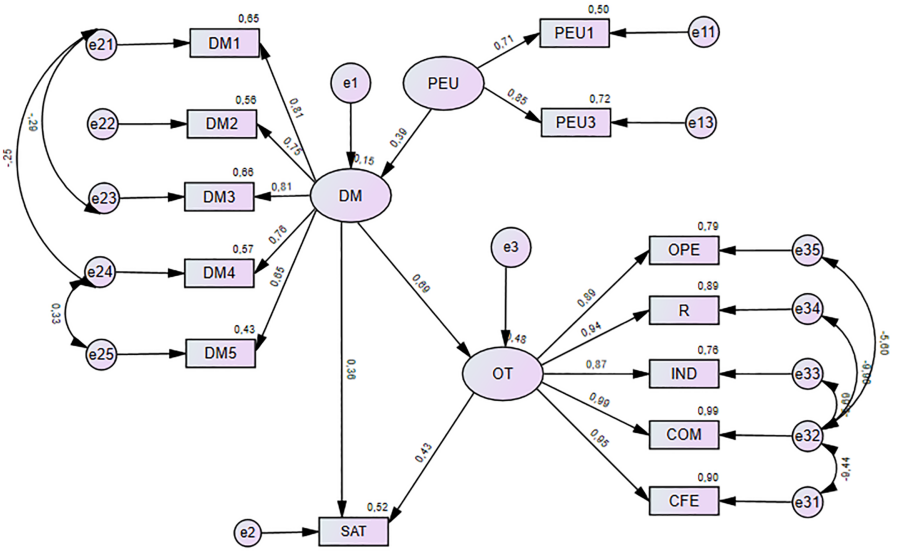

Figure 1. The obtained structural model. Source: Authors' own elaboration

Table 5. Pathway coefficients of the measurement equation model ($n = 200$)

Path	Standardized estimate	Unstandardized estimate	S.E.	C.R.	*P*-value
OT → CFE	0.950	1.000			
OT → COM	0.994	1.043	0.087	12.025	<0.001
OT → IND	0.874	0.833	0.040	21.088	<0.001
OT → R	0.945	1.032	0.037	27.779	<0.001
OT → OPE	0.892	0.867	0.039	22.466	<0.001
DM → DM1	0.807	1.000			
DM → DM2	0.748	0.922	0.087	10.645	<0.001
DM → DM3	0.812	1.007	0.092	10.853	<0.001
DM → DM4	0.756	0.818	0.082	9.906	<0.001
DM → DM5	0.653	0.849	0.092	9.138	<0.001
PEU → PEU1	0.708	1.000			
PEU → PEU2	0.846	0.840	0.277	4.441	<0.001

Note(s): S.E.: Standard Error, C.R.: Critical Ratio, *P*: *p*-value
Source(s): Authors' own elaboration

Table 6. Pathway coefficients of the structural equation model ($n = 200$)

Hypothesis	Path	Standardized estimate	Unstandardized estimate	S.E.	C.R.	*P*-value	Hypothesis acceptance
H1	PEU to DM	0.387	0.412	0.096	4.310	<0.001	Accepted
H2	DM to OT	0.691	0.807	0.084	9.559	<0.001	Accepted
H3	DM to SAT	0.355	0.462	0.105	4.385	<0.001	Accepted
H4	OT to SAT	0.428	0.476	0.080	5.973	<0.001	Accepted

Note(s): S.E.: Standard Error, C.R.: Critical Ratio, *P*: *p*-value
Source(s): Authors' own elaboration

Table 7. Standardized total, direct, and indirect effects within the structural model

	Total effect			Direct effect			Indirect effect		
Variable	PEU	DM	OT	PEU	DM	OT	PEU	DM	OT
DM	0.387	0	0	0.387	0	0	0	0	0
OT	0.268	0.691	0	0	0.691	0	0.268	0	0
SAT	0.252	0.650	0.428	0	0.355	0.428	0.252	0.295	0

Note(s): Path PEU → DM → SAT total effect (TE) = 0.137, path PEU → DM → OT → SAT TE = 0.114, model (PEU → SAT) TE = 0.252
Source(s): Authors' own elaboration

analysis performed based on a specific sample are sufficient to accept the proposed hypotheses. The first validates the relationship between the PEU by primary healthcare managers and the DM of the organization. The results showed that PEU had a statistically significant, positive, and moderate impact on DM (path factor = 0.39, $p < 0.001$), which was sufficient to accept hypothesis H1. A greater level of PEU is related to a greater organization's DM, although as a predictor of digital maturity, PEU explains only 15.0 % of its variance. This leaves space for further exploration of the determinants of the DM. The results also showed a positive, significant, and strong relationship between DM and OT (path factor = 0.69,

$p < 0.001$), DM and SAT (path factor = 0.36, $p < 0.001$), and OT and SAT (path factor = 0.43, $p < 0.001$), which is the basis for accepting hypotheses H2, H3, and H4, respectively. Moreover, we performed mediation analysis using direct and indirect effects based on bootstrap procedures (1,000 samples) and bias-corrected bootstrap confidence interval (95%). Results showed that DM and OT partially mediated the relationship between environment uncertainty perceived by primary healthcare managers (PEU) and their job satisfaction, as indirect effects are statistically significant. The indirect (mediated) effect of PEU on SAT was significantly different from zero at the 0.01 level ($p = 0.002$, two-tailed). We obtained this bootstrap approximation by constructing two-sided bias-corrected confidence intervals. Summarizing, we can explain SAT not only by the direct impact of organizational DM and the level of OT but also by the indirect impact of DM and PEU. Predictors of SAT explained 52% of its variance, demonstrating the high explanatory power of the built model.

Discussion

This study aimed to explore the perceived environmental uncertainty (PEU) of primary care managers in the UK and its impact on the digital maturity (DM) of primary care facilities. Furthermore, it examined the relationship between DM, job satisfaction (SAT), and organizational trust (OT). Our findings emphasize that primary healthcare managers perceive their operating environment as highly volatile due to the impact of dynamic regulatory changes, resource constraints, and increasing patient demands. This complex environment necessitates a nuanced understanding of how digital maturity can serve as a buffer against organizational uncertainty. By integrating contingency theory with sociotechnical theory, the study highlights the interplay between external environmental factors, organizational adaptability, and the coevolution of technological and human systems in primary healthcare settings. The findings indicate that higher levels of PEU lead to greater DM within primary care facilities, although PEU accounts for only 15.0% of the variance in DM. This modest variance highlights that while PEU is a significant driver, other factors, such as organizational culture, resource availability, and leadership, likely play an essential role in achieving higher DM. Future studies could further unpack these complementary influences. Digital technologies facilitate quick and efficient access to critical information, offering a means to mitigate uncertainty. In this context, digital tools are not merely transactional but serve as transformational mechanisms that realign strategic priorities and redefine operational workflows. Li and Li (2010) note that mature digital technologies provide long-term solutions for decision-making under uncertainty, while Chen and Tian (2022) emphasize the critical role of resource organizations in digital transformation efforts resulting from environmental uncertainty. As Duncan *et al.* (2022) points out, the implementation of digital systems enhances healthcare services and improves patient experience. However, our findings extend this narrative by illustrating that DM transcends technological upgrades; it represents a comprehensive organizational shift encompassing modernized services, optimized processes, an upskilled workforce, cultural shifts, and improved adaptability (Chanias & Hess, 2016). Organizations are not merely adopting technology but integrating it into their core operations, enabling them to navigate uncertainty more effectively. Our study reveals a positive correlation between DM and OT in primary care facilities, a finding consistent with prior research by Ramachandran *et al.* (2023) and Woods *et al.* (2023). Some studies suggest that digitalization has reshaped trust, shifting its foundation from interpersonal relationships to systemic sources (Agyekumhene *et al.*, 2018; Lumineau *et al.*, 2023), with formal mechanisms replacing traditional interpersonal exchanges as the basis of trust (Fielke *et al.*, 2020). Furthermore, our results demonstrate that DM has a significant positive impact on SAT. Managers in facilities with higher DM report greater job satisfaction. Research by Turja *et al.* (2024) supports these findings and suggests that SAT increases as digital solutions mature and employees gain experience. Moreover, increased DM can reduce workloads through automation and efficiency improvements. Mettler (2011) argues that fully developed and

implemented technologies can enhance job satisfaction, a conclusion that finds confirmation in the study by Zaresani and Scott (2020) and Klus and Müller (2021). Digital technologies enable managers to access real-time information and respond quickly to challenges (Waheed, 2010). These technologies can also improve productivity, create more engaging work environments, facilitate better interactions with colleagues and supervisors, and offer greater autonomy and flexibility for employees (Bolli & Pusterla, 2022). Our study found strong, positive relationships between DM and OT, DM and SAT, and SAT and OT. Shockley-Zalabak *et al.* (2000) emphasize that trust is critical to organizational effectiveness, adaptability, and innovation. High levels of OT contribute to greater organizational success, whereas low trust can hinder progress. Lambert *et al.* (2021a, b) underscore the importance of trust as a foundational element for stable intra-organizational practices.

While this study contributes important insights into primary healthcare (PHC) management, we should mention several limitations. First, the use of a non-probability sampling method may introduce selection bias, limiting the generalizability of findings beyond the studied context. Future studies should consider probabilistic sampling to enhance representativeness and robustness. Second, reliance on self-administered questionnaires introduces the risk of common method and social desirability biases, which may cause respondents to overstate their positive perceptions. To mitigate this issue, future research could use mixed methods, such as qualitative interviews or observations, and apply techniques like respondent anonymity, indirect questioning, and reverse-coded items. Third, despite employing validated constructs and assessing content and construct validity, common method variance remains a concern. Procedural solutions, including temporal separation of data collection or multiple informants per organization, can help address this problem. Statistical methods like Harman's single-factor test or confirmatory factor analysis may also help limit method bias. Moreover, the study's cross-sectional design limits the ability to infer causality among PEU, DM, SAT, and OT. Longitudinal designs could better capture the evolving dynamics of digital transformation and reveal reciprocal relationships. The study adopted a focused conceptual framework based on four key constructs. However, future research should examine additional moderating or mediating factors, such as organizational culture, leadership style, or uncertainty tolerance, that may influence the effects of PEU. Expanding the geographic scope of future studies would also allow for cross-national comparisons, helping to distinguish between universal and context-specific factors that drive digital maturity. In turn, this could support the development of tailored strategies and offer actionable recommendations for policymakers aiming to enhance healthcare resilience. Lastly, the study relies on data collected at the individual level to assess constructs defined at the organizational level, such as DM and OT. As managers serving as key informants reported these findings, which is a common practice in organizational research, this approach introduces potential subjectivity. Future studies should consider multilevel designs or triangulate data from multiple organizational levels to validate the results. Moreover, while managers can effectively assess organizational trust, researchers often measure this construct among frontline employees. Gathering data from multiple sources, including line staff, would enhance validity and provide insights into perceptual differences across hierarchical levels.

Contingency theory posits that organizational effectiveness hinges on the alignment between environmental conditions and structural or strategic responses. In this case, PEU reflects the dynamic, resource-constrained, and regulatory challenges that primary care managers face. The findings reveal that DM serves as a strategic response to this uncertainty, embodying an organization's capacity to adapt its technological and human systems to external volatility. This alignment between environmental demands and technological transformation exemplifies the core tenets of contingency theory, demonstrating how organizations thrive by adapting their structures to environmental conditions. From the sociotechnical perspective, DM represents more than technological adoption; it embodies a comprehensive transformation that realigns workflows, modernizes processes, and fosters a culture of adaptability. The results extend sociotechnical theory by showing how technology

and human factors coalesce to reduce uncertainty, enhance decision-making, and improve organizational outcomes. For example, mature digital systems enable real-time access to information and seamless integration of workflows, creating a sociotechnical alignment that supports strategic agility. The positive correlations between DM, OT, and SAT underscore the dual influence of contingency and sociotechnical frameworks. High DM not only mitigates the adverse effects of PEU but also strengthens trust within organizations, which is consistent with findings that trust increasingly derives from systemic rather than interpersonal sources. This systemic trust, finding support in robust digital platforms, fosters job satisfaction by creating more engaging, autonomous, and efficient work environments. Contingency theory explains these relationships as an organizational adaptation to the external environment, while sociotechnical theory highlights the internal harmony that originates from the co-development of people and technology. These findings have significant implications for strategic management researchers, decision analysts, and industry professionals involved in healthcare planning and policy. The study underscores the importance of DM as a critical mechanism for navigating PEU in primary healthcare organizations. Managers operating in dynamic environments should prioritize initiatives that enhance DM, including the adoption of advanced digital tools such as telehealth platforms, data analytics systems, and integrated electronic health records. Complementary efforts should focus on workforce upskilling, leadership development, and fostering a culture of innovation and adaptability to support digital transformation. Policymakers play a crucial role in enabling these efforts by providing financial support, fostering public-private partnerships, and establishing legislative frameworks to ensure interoperability and data security. Enhanced DM directly benefits healthcare organizations by improving resource allocation, enabling real-time decision-making, and fostering trust and job satisfaction among employees. These organizational improvements lead to broader societal benefits, including faster diagnosis, personalized care, and equitable access to healthcare, particularly in underserved areas. Moreover, digital transformation strengthens organizational resilience, enabling healthcare facilities to respond effectively to public health emergencies and other crises. By framing DM as a holistic transformation, managers and policymakers can create a more resilient healthcare system that addresses immediate challenges while building a foundation for long-term success and improved patient care outcomes.

Conclusion

This study aimed to explore the PEU among primary care managers in the UK, its impact on the DM of PHC facilities, and the relationship between DM, SAT, and OT. The findings indicate a positive relationship between PEU and DM in PHC organizations. Managers perceive their environment as highly dynamic and rapidly evolving, particularly in the technical, economic, and cultural dimensions, which in turn influences the DM of their organizations. The study highlights that PEU significantly shapes various dimensions of DM, including strategic, technological, operational, and cultural aspects. Increased environmental uncertainty encourages organizations to adopt digital initiatives aimed at improving service quality, reducing costs, and enhancing organizational efficiency. Digital maturity extends to data-driven decision-making, aligning the processes with both patient and organizational needs, and fostering a workforce that is digitally skilled and competent. Furthermore, the results suggest that DM enhances both SAT and OT. Digital systems enable organizations to better navigate uncertainty, fostering trust by integrating formal, system-based mechanisms that replace traditional interpersonal exchanges. This shift underscores the evolving role of digital technologies in reshaping organizational dynamics and trust. However, researchers should not see DM only as a technological change but as a multidimensional transformation that aligns strategy, technology, operations, and culture to meet the expectations of patients, employees, and partners. Ultimately, DM strengthens trust within organizations by creating value through enhanced adaptability and responsiveness to environmental challenges.

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Corresponding author
Liliana Hawrysz can be contacted at: liliana.hawrysz@pwr.edu.pl

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