Déterminants de l'utilisation des données fournies par les utilisateurs dans un secteur public axé sur les données : Validation d'une adaptation du modèle UTAUT avec des professionnels et des gestionnaires de santé.

Determinants of user-reported data use for a data-driven public sector: Validating an adaptation of the UTAUT model with professionals and managers in healthcare

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Abstract

Citizens'-reported data is crucial for improving service quality and innovation across various sectors, including healthcare. This study focuses on understanding the determinants that prevent or encourage healthcare professionals and managers to use user-reported data. To explore these determinants, we adopted the Unified Theory of Acceptance and Use of Technology (UTAUT) model, which has been widely applied in various fields. This research is ongoing. Its first phase encompasses a qualitative study involving 13 semi-structured interviews with healthcare professionals and managers in Italy and Wales. The results from this phase will inform a subsequent quantitative survey involving a larger sample. Preliminary findings indicate that all the hypothesized UTAUT factors can significantly influence the utilization of healthcare user-reported data. Participants confirmed the importance of performance expectancy, effort expectancy, social influence, facilitating conditions, habit, perceived security, trust and anxiety as the main determinants. Future results will provide a comprehensive view of these factors in diverse user-reported data scenarios and digital platforms.

Résumé

Les données fournies par les citoyens sont cruciales pour améliorer la qualité des services et l'innovation dans divers secteurs, y compris la santé. Cette étude se concentre sur la compréhension des déterminants qui empêchent ou encouragent les professionnels et les gestionnaires de la santé à utiliser les données rapportées par les utilisateurs. A cet effet, nous avons adopté le modèle de la Théorie unifiée de l'acceptation et de l'utilisation de la technologie (Unified Theory of Acceptance and Use of Technology - UTAUT), largement appliqué dans plusieurs domaines. Cette recherche est en cours. Sa première phase comprend une étude qualitative impliquant 13 entretiens semi-structurés avec des professionnels et des gestionnaires la santé en Italie et au Pays de Galles. Les résultats de cette phase permettront d'élaborer une enquête quantitative ultérieure impliquant un échantillon plus large. Les résultats préliminaires indiquent que tous les facteurs hypothétisés par le modèle UTAUT influence de manière significative l'utilisation des données fournies par les utilisateurs du système d santé. Les participants ont confirmé l'importance de facteurs tels que l'attente de performance, de l'effort attendu, de l'influence sociale, des conditions facilitatrices, de l'habitude, de la sécurité perçue, de la confiance et de l'anxiété comme principaux déterminants. Les futurs résultats fourniront une vue d'ensemble complète de ces facteurs dans les divers scénarios de données rapportées par les utilisateurs et des plateformes numériques.

Keywords

User evaluation; user-reported data; service management; healthcare; interviews

Mots-clés

Évaluation par l'utilisateur; données rapportées par l'utilisateur; gestion des services; santé; entretiens

1. Introduction

Data-driven decision-making is crucial for modernizing public administration.

Digital transformation enables, on the one hand, the production of great amount of data, and, on the other hand, an intensive use of data, presenting both opportunities and challenges for public organizations in their public value creation process. Public value has been defined under a multi-dimensional model (S. P. Osborne, 2018) where participation is articulated both as a means and an end to value creation process. In the realm of public service, value creation revolves around five key aspects including: (1) the influence of these services on users' satisfaction and overall well-being; (2) the outcomes produced by public services; (3) the impact of public services on the entire life experience of citizens; (4) the capacity of public services to empower citizens for future challenges; and (5) the role of public services in generating value at a societal level (S. Osborne, 2020).

In an age where vast amounts of data are generated, ensuring that data are secure, reliable, and comprehensible for all users and participants in data-driven decision-making is crucial for increasing the public value. Digital technologies, such as artificial intelligence, can effectively utilize large datasets, manage information, and produce knowledge (Androniceanu, 2023; Valle-Cruz & García-Contreras, 2023). The digital technologies supporting data-driven decision-making can reduce bureaucracy and expense, while improving service quality, productivity, accessibility, and transparency (Androniceanu, 2023). Implementing these systems will significantly enhance the way public organizations manage data throughout the value chain. Alexopoulos pointed broadly to a data-driven society as a benefit of applying digital tools such as artificial intelligence on data in the public sector (Alexopoulos et al., 2019).

The Organisation for Economic Co-operation and Development (OECD) has defined the data-driven public sector, highlighting data as a valuable asset essential for evidence-based policy making, data-backed service design and delivery, organisational management, and innovation, and accountability, integrity, openness and fairness of decision-making as well (Van Ooijen et al., 2019).

"*A data-driven public sector recognises data as a strategic asset in policies and services design and delivery. It implies the development of sound data governance structures (including data strategies, institutional arrangements, rules) and related delivery mechanisms (data infrastructures, standards) to capitalise on the value of data to anticipate and respond to the needs of users, deliver better services and policies, and promote data integration, access, sharing and use across the public sector. A data-driven public sector also favours the use of innovative and alternative sources of data in the evaluation and monitoring of policies and services over time*" (Ubaldi & Okubo, 2020).

The framework of van Ooijen, Welby, & Ubaldi (2019) illustrates that establishing a data-driven approach in the public sector is complex, non-linear and based on a recursive value chain. There is a loop between sharing and using/re-using data that, once initiated, can positively reinforce the first steps of the process. Data use and usability is, thus, a critical aspect in the instituting of a data-driven public sector.

van Ooijen, Welby, & Ubaldi (2019) explored other several and significant challenges to the adoption of data-driven processes of decision-making. One of the primary challenges is obtaining useful data, which includes ensuring data availability, maintaining high standards of data quality, and ensuring the relevance of the data collected to the public sector's needs. Data sharing, discoverability, and interoperability present additional obstacles. Human and technical capacities must also be addressed by building a workforce with a diverse range of digital skills necessary to analyse and use data effectively. Legitimacy and public trust are also fundamental, so ensuring the ethical and accountable use of data and the need to act on data insights to drive improvements and, ultimately, value creation. Protecting the privacy of citizens and ensuring transparency in data use are also critical. Addressing these challenges is essential for unlocking the full potential of a data-driven public sector, enabling more informed decision-making, improving service delivery, and fostering innovation.

A case study by Choi and colleagues (2021) found that data-driven decision-making is influenced not only by technical factors such as data quality and coverage, compatibility and interoperability, availability of external data, information technologies and software, analytical techniques, privacy and confidentiality considerations, but also by organizational aspects such as cooperation among stakeholders, organizational culture, and public procurement policies (Choi et al., 2021). The empirical study's results suggested the need for comprehensive strategies to harness the full potential of data in improving decision-making, service delivery, and innovation in the public sector, with robust organizational and institutional support as key determinant for successful implementation of data-driven decision making.

More recently, Cantarelli and colleagues (2023) recognized three separate elements in comprehending how information is utilized in public organizations: the objective characteristics of information architecture; the subjective processes that involve cognitive biases (such as overestimating or underestimating the value of information) and decision noise (i.e., variability in decision-making); and the moderating influence of the different types of information users (Cantarelli et al., 2023).

The common elements identified across these studies regarding the adoption and implementation of data-driven public sector decision-making can be summarized as follow: data quality and availability; technical and human capacities, including subjective elements in decision-making processes such as cognitive biases and decision noise; organizational and cultural factors; ethical and privacy considerations. All studies point to the potential of data-driven decision-making to improve service delivery, foster innovation, and create value in the public sector, provided the above challenges are addressed effectively.

Thus, enabling data-driven activities requires investigating the conditions necessary for effective data use in the public sector, recognizing and addressing the challenges to unlocking data's full value.

Barcevičius et al. (2019) review of the literature identified numerous outputs of digital transformation in governments, such as new and renewed services, processes, skills, and products, by affecting internal processes and service delivery (Barcevičius et al., 2019). Digital transformation in the context of public sector innovation can support efforts to enhance the quality of public services in a data-driven society by transforming service delivery.

As reported by van Ooijen and colleagues (2019), the opportunities that can be derived from exploring the adoption of a data-driven culture within public organizations includes anticipatory approaches, implications on public service design and delivery, and impact on public performance monitoring and management. In particular, data-driven processes of decision making for service design and delivery implies leveraging data more effectively to comprehend issues and identify users, thereby responding more accurately to their needs. This involves using open communication methods and proactive data generation strategies, including collecting data from users. "*Engaging with citizens as co-value creators*" is reported among these strategies. Additionally, it highlights the move from top-down implementation assumptions to user-centered design approaches, which consider contextual differences to tailor services and enhance flexibility.

To this regard, data-driven decision making can support also a truly "customer-centric" public service, by transforming the observation and listening of citizens and services' users into data, knowledge and an opportunity of improvement and co-design. As written by Yves Caseau (2022) "*The revolution of the digital age of the 21st century is that customer orientation is more imperative -- the era of abundance, usages rate of change, complexity of experiences, and shift of power towards communities -- are easier, using digital tools and digital communities*" (Caseau, 2022). While the concept of customer orientation is well-established in the private sector, it differs significantly in public services. For publicly funded services, the term "customers" is often neither meaningful nor precise. Moore (2012) emphasized using the term "citizen" over "client" in the public sector, highlighting the blurred line between public service users and citizens (Moore, 2012). Citizens express fundamental needs, often constitutionally protected, which differ from private sector needs. Citizens support public services financially through taxes based on economic capacity, not individual needs. Thus, the real "customers" of public organizations are the collective citizens, who fund these services and act as collective overseers. On the other hand, there are the users of public services who can be extended to all individuals, regardless of their citizenship. Adopting user-centricity, despite inherent information and relational asymmetries, requires integrating user-reported data into measurements, evaluations, evidence to be uptake in data-driven decision-making processes. Public management approaches, like New Public Management, New Public Service, and Public Service Logic, emphasize citizen involvement in decision-making, with users as co-creators of value alongside public organizations. Moore (2012) discussed integrating the user satisfaction into public value measurements, suggesting public value is defined by the collective. The integration of this kind of data in the decision-making processes could create potential tensions to be addressed for understanding the contributions of decision-making also driven by user-reported data to the creation of individual and public value.

Understanding in the real-world the challenges to be addressed and how to co-create a data-driven process of decision-making in the public sector cannot disregard the perspective of public servants who should use data and particularly data reported by public services' users. As highlighted by Baron and colleagues (2023), the shift from traditional public management to digital government overlooks the practicalities of administrative operations, which in turn is influenced by inner characteristics of the institutions, such as their complexity (Baron et al., 2023; Dunleavy et al., 2006). The co-creation with who should use the digital resources, in this case for supporting user-reported data use, is reported by Yves Caseau (2022) among the three capabilities of reference to derive more value from the digital transformation.

Despite the increasing amount of literature on data-driven decision-making, and more recently on big data, there are still few empirical studies examining processes and strategies that government agencies use to implement this approach with a clear request for studies exploring the fundamental conditions necessary for advancing the research on data-driven decision making (Choi et al., 2021).

To the best of our knowledge, there is also a gap in literature about the conditions that support user-reported data uptake in a data-driven decision-making process.

Given these premises, this paper is aimed at adapting, and proposing to academics and practitioners a tool for understanding the determinants that prevent or encourage public employees, professionals and managers to use data reported by users in their decision-making processes. The application of the study is the public healthcare sector in two countries, namely Italy and Wales.

2. Why the public healthcare services?

Studying the public healthcare sector is crucial due to its significant role in public service delivery, which is extensively considered in the literature alongside public safety and security (Codagnone et al., 2020).

The public healthcare sector, particularly systems that ensure universal coverage under the Beveridge model, has unique characteristics in terms of stakeholder composition and relationships. Key stakeholders include citizens (and patients as a subgroup), national and regional policymakers, healthcare managers, and professionals (De Rosis et al., 2019, 2020; Nuti et al., 2016). Differently from healthcare mainly funded by insurance under the Bismarck model (such as Netherlands, Germany etc.), in the Beveridge models, citizens, through their taxes, fund the healthcare system and elect policymakers who set strategies and choose management. Policymakers shape the healthcare system's policies and goals, while managers ensure that healthcare professionals can perform their duties effectively, managing the organization's performance and financial sustainability. Healthcare professionals, such as doctors and nurses, deliver services in various settings, significantly influencing patient care quality and costs.

The literature categorizes citizens into consumers, clients, users, and patients, each with different needs and interactions with the healthcare system (Herxheimer & Goodare, 1999). Consumers purchase health-related goods, clients use professional healthcare services, users have utilized or might utilize any healthcare service, and patients seek treatment due to illness. Caregivers, who support patients, also play a crucial role.

Healthcare services are highly relational and emotionally intensive, impacting patient experiences and satisfaction (Berry, 2019; Berry et al., 2015; McColl-Kennedy et al., 2017). The interactions between healthcare providers and patients are vital for positive service experiences, a good perception of service quality, and for reinforcing the trust in the service providers and the whole system. The asymmetry of information between patients and providers means patients rely heavily on the professionals' expertise, which can lead to anxiety and uncertainty.

Involving all stakeholders is essential to meet user needs and ensure the system's responsiveness. Patient engagement is increasingly recognized as critical for effective healthcare delivery. It is not only about sharing decision-making at the point of contact and participating actively in their care, leading to a shift from a paternalistic approach to a collaborative partnership. Patients are now seen as co-producers in healthcare, contributing valuable knowledge. This collaborative model emphasizes mutual value creation between patients and healthcare providers, enhancing the overall effectiveness and satisfaction within the healthcare system, and supporting a user-centric approach to the service delivery (Batalden et al., 2016; Godlee, 2017; Richards et al., 2013; Voorberg et al., 2014).

The person-centered approach in healthcare (Håkansson Eklund et al., 2019) places current or potential users, whether they are clients, consumers, patients, caregivers, at the centre of individual decision-making processes at the micro level, as well as the assessment of service quality at the public organization and public system levels of the healthcare sector. According to Tseng and Hicks (2016), experience measures reported by the healthcare service users would facilitate aligning the person-centred approach with value-based care, because the use of these data could nourish the processes of decision-making at all the levels of the healthcare sector, from the micro level of the encounter between the patient and the doctor, to the macro level of the policy making, with the aim of creating value both at the individual and collective levels (Tseng & Hicks, 2016). Therefore, studying the public healthcare sector provides valuable insights into how digital innovations can revolutionize service delivery and encourage the transition towards more user-centric approaches by supporting a user-reported data-driven decision-making.

In addition, the healthcare sector's widespread adoption of digital innovations has led to a shift from traditional face-to-face care to digitalized delivery of services. These advancements also enabled continuous and real-time information collection about patients and their experience with services (De Rosis et al., 2020). Digital technologies can, thus, empower citizens to report about public services' quality, enhancing their engagement (Codagnone et al., 2020). Authors exploring opportunities to achieve fairness and equity in data-driven public administrations argue that data can empower marginalized groups, like patients, by engaging them as collaborators in the process (Ruijer et al., 2023).

Understanding the impact of digital transformation for a data-driven public healthcare is essential because it highlights the sector's ability to adapt to and integrate new technologies for better service design and delivery, and for monitoring and improving the performance as well.

2.1. The challenges to user-reported data-driven public healthcare

The literature highlighted the importance of user-reported data for improving service quality as well as for service innovation, in different sectors, including healthcare. Indeed, user-reported data is essential for improving the quality of services, detecting service gaps, and raising service standards; it helps organizations understand the needs, preferences, and expectations of their users, so they can better handle user complaints and other issues and make the required adjustments (Murante et al., 2014; Pai & Chary, 2013; Parasuraman et al., 1988, 1994). Moreover, user opinions can be a great source of inspiration and knowledge for service innovation. Organizations can use consumer-reported data to discover new service opportunities, identify emerging trends, and create cutting-edge service offers (Berry, 2019; S. P. Osborne et al., 2016; Prahalad & Ramaswamy, 2004b, 2004a). Managing user-reported data can be complex and challenging for organizations (Da Silva, 2021). For instance, even though many departments and functions have systems in place to track user-reported data, few organizations have an integrated, corporate-wide perspective on user experience (Da Silva, 2021). In this sense, factors such as integrity, reliability, and robustness of the data collection and use process, but also time and effort, obstacles and bureaucracy need to be taken into consideration (Da Silva, 2021). Moreover, after data collection, companies still need to produce relevant user insights or knowledge about users that create value for the organization. In this sense, data analysis is important, as is using the results for decision-making (Holmlund et al., 2020).

In healthcare, user evaluation can be collected via outcomes and experience measures (in general referred to as patient-reported measures) (De Rosis et al., 2019, 2022). However, collecting patient opinions through surveys is not enough to change the behaviour of public servants. Data should be used by managers and professionals for improving the quality of services, their responsiveness, their potential innovation and re-design (Coulter et al., 2014). More precisely, the experiences of application of patient-reported measures can be categorized along two key dimensions: the level of data aggregation and the use in the doctor-patient relationship (Brundage et al., 2013; Snyder & Aaronson, 2009). Individual-level aggregated patient-reported data can be used as screening tools to identify specific issues (e.g., anxiety, depression, physical and social functioning). In this context, they serve to monitor the impact of a particular treatment on an individual patient, promoting a patient-centred care approach that focuses on the patient's perspective. In this case of group/population-level aggregation, data are used to support decision-making regarding different interventions or treatments and whether patient needs have been met by the healthcare system. The focus is on the effectiveness and overall impact of care at a population level. When data are used as decision-support tools in the doctor-patient relationship, they can facilitate structured exchanges of information on often overlooked topics, offering a common language among professionals from various disciplines, which is particularly useful in managing complex patients, such as elderly individuals with chronic conditions. When data are not used within the patient-doctor relationship, they can be employed as quality-of-care assessment tools. These tools enable the evaluation of the quality of care (particularly in terms of effectiveness) and allow for comparisons between providers (e.g., hospitals), with the goal of improving the quality of healthcare on a larger scale. To bring about a change, it is important to incorporate the patient experience and outcome improvement goals into the planning, feedback, and assessment procedures (Ferreira & Otley, 2009; Murante et al., 2014). Yet, patient-reported outcomes is seldom used to estimate the value of different interventions and whether patient needs have been met by healthcare system in real world evidence (Manetti et al., 2024; Nguyen et al., 2021).

Barriers have been highlighted in the literature about the use of healthcare user-reported data as a routine management tool (Coulter et al., 2014; Lungu et al., 2020; Porter et al., 2016). One key factor is data sharing and dissemination, also using digital infrastructure to turn data into actionable insights for decision-making (Flott et al., 2017; Gleeson et al., 2016). Indeed, user-reported data increasingly is provided to healthcare professionals and managers with different types of technologies (Johanssen et al., 2019). The use of technological tools can influence the frequency with which professionals acquire user-reported data. In this sense, reducing manual steps in favour of (semi)automated processes may encourage approaches that allow continuous and systematic user-reported data, rather than periodic contexts (De Rosis et al., 2020; Johanssen et al., 2019).

In this sense, the UTAUT (Unified Theory of Acceptance and Use of Technology) model (Venkatesh et al., 2003) can be a useful lens to investigate the topic of the use of patient-reported data in healthcare organizations. This model is tested in the healthcare sector for verifying whether its determinants are valid also when applied at the use of patient-reported data by managers and healthcare professionals in their decision-making processes. In this study, we adopted a qualitative approach to validate the UTAUT model within the healthcare sector for twofold reasons. The UTAUT model, while widely used across various fields, was not originally designed nor for healthcare nor for data as essential component of the digital sphere. It has applied to the evaluation of determinants of mobile applications, wearable technologies, websites, digital dashboards. Although there are studies applying UTAUT to healthcare technologies, there remains a lack of evidence regarding how users interpret the model's items or whether they feel certain key factors are missing when handling information, figures, statistics and so on. This study addresses this gap by using qualitative data to explore the model's relevance and validity in using data within the healthcare context. Furthermore, while existing research has investigated or validated UTAUT in healthcare through quantitative methods, our study offers a novel contribution by employing a qualitative approach, which allows for a deeper understanding of the public servants' perspectives.

3. Why Italy and Wales?

The study was conducted in different regional healthcare systems in two countries, namely Italy and Wales, since they have a similar organizational structure and have established experience of collection of patient-reported data.

Both countries have healthcare systems that are primarily public and based on principles of universal access to healthcare under the Beveridge model, funded by the citizens' taxes and with devolution granting autonomy in health management at the regional level (Bevan et al., 2014; Donatini, 2020; NHS Wales, 2020; OECD, 2019).

In National Health Service (NHS) Wales clinical services increasingly collect PROMs (Patient-Reported Outcome Measures) as part of routine care and use them to inform shared-decision making and transform the way healthcare is delivered to achieve better outcomes that matter to patients (EIT Health, 2020; Withers et al., 2021).

In 2018, the Welsh Government has explicitly emphasized the importance of involving patients in decisions regarding their care - (NHS Wales 2018). It has established that the planning and delivery of services will be grounded in prudent healthcare principles and value-based healthcare. Implementing value-based healthcare represents a significant cultural and transformational shift in Wales, emerging from grassroots efforts as a means to realize the goals of Prudent Healthcare. The NHS Wales is committed to supporting the implementation and development of outcome measurements and cost analysis through a collaborative data-sharing approach, to enhance the quality of healthcare services and increase value for patients. This entails measuring healthcare costs at the system level and making this information accessible to clinical teams, empowering them to manage resources effectively and promote high-value care for the populations they serve. Healthcare organizations in Wales are dedicated to advancing value-based healthcare initiatives. This commitment includes improving the collection and reporting of wholistic outcome data across various medical conditions and analyzing unwarranted variations in services and outcomes. These PROMs collection initiatives can support the identification of areas of both underuse and overuse within the healthcare system. PROMs may provide useful communication between a person and their healthcare team to support direct care, or enable a person to track their own progress or recovery. They should therefore not just be viewed as an end point, but they can also be a milestone or status at a point in time for an individual to report how they are faring - in areas of their life that matter to them, and in a structured way. Aggregated PROMs can provide a useful needs assessment, helpful in determining local or national service development. Different condition pathways have been nationally agreed by clinical reference groups and all of these pathways are currently available on a national platform. For healthcare professionals, PROMs can play a crucial role in optimizing outcomes at multiple levels. For individual patients, PROMs help the clinical team focus on what truly matters to them. By analyzing aggregated PROMs data, patients can make informed decisions about their care, drawing from the experiences of others with similar conditions. At the cohort level, PROMs provide valuable data that can inform improvements to patient pathways, evaluate the outcomes of specific treatments, and guide the appropriate selection of patients for those treatments.

On a health board and population level, PROMs data can lead to more efficient and effective care, while also reducing expenditure on low-value interventions. This opens up opportunities for reinvestment in treatments that deliver real value in healthcare. In Wales, the collection of generic PREMs is guided by a national approach from the Welsh Government, with an updated questionnaire expected soon. A digital platform has been rolled out nationally to collect Patient Reported Experience Measures (PREMs). The national clinical framework encourages the use of PREMs by specialties, with many now implementing condition-specific PREMs locally. Efforts are also underway to establish data and interoperability standards for PREMs, similar to PROMs.

The Italian National Health Service has always promoted the collection and use of the patient's voice, facilitating the participation of healthcare services' users in the evaluation of services. The Italian reform introduced by the Legislative Decree No. 502/1992 requires that healthcare organizations and regional systems to establish "*monitoring and control systems (...) on the quality of care and the appropriateness of the services provided*," including "*the satisfaction of service users*" (art. 8 octies). This has supported the spread of several experiences of PREMs collection. Given the fragmented situation due to the decentralization of organizational power to the Italian Regions, the Italian experiences have been mainly one-shot initiatives in the form of patient satisfaction surveys, managed at the single hospital level, or at the regional healthcare system level, such as in the regions of Tuscany, Lombardy, Emilia-Romagna. The only systematic surveys at the national level are targeted at representative samples of the general population by the national statistical institution ISTAT. Approximately every five years, a sample survey on "Health Conditions and Use of Healthcare Services" is administered. Apart from some regional initiatives (De Rosis et al., 2020), briefly described below, there are no systematic and continuous national patient surveys across Italian regions. Recently, the 2019-2021 Italian Health Pact highlighted the importance of customer experience and citizen participation in the evaluation of services. Specifically, in Sheet 14 on "Tools for Citizen Participation and Personalized Access to Healthcare Services," it underscores the relevance of *“promoting and implementing enabling tools that improve interactions and the customer experience”* also through *“the adoption of shared rules, standards, and codes for the interoperability and integration of ecosystems*.”

The above-mentioned examples of routine collection of PREMs (De Rosis et al., 2020) and PROMs (De Rosis et al., 2021; Ferrè et al., 2021; Lungu et al., 2020; Pennucci et al., 2020) have been piloted in Tuscany region and then joined by other regional healthcare systems or organization, with the scientific support of the MeS Laboratory. The routinely collection of PREMs and PROMs has formally started in the period 2017-2018. The methodology employed the systematic and continuous collection and reporting of data, so building an intra and inter-regional Observatory, allowing the use of the same tools of patient-reported data collection and the potential of benchmarking of data across Italian regional healthcare systems joining the Observatory (De Rosis et al., 2020). The PREMs and PROMs Observatories have been joined by various Italian regions (De Rosis et al., 2020). The patient-reported data have become important tools of accreditation and measures of hospital performance, and have been progressively integrated into the Performance Evaluation System of the MeS Laboratory (De Rosis et al., 2022; Gilmore et al., 2019). In light of this, in 2019, as part of its participation in the experimental phase of the OECD PaRIS (Patient-Reported Indicator Survey) project on primary care and chronic conditions, the Italian Ministry of Health planned and subsequently initiated a national pilot aimed at establishing an Observatory on experience and outcome measures reported by chronic patients. This Observatory would systematically and continuously capture the voice of patients at the national level, potentially and eventually building a patient-reported information flow that integrates data from the Ministry's administrative records (Vainieri et al., 2022).

In both countries, the collection and use of patient-reported data are supported by digital platforms. These latter are aimed at making possible access and review of patient-reported data for healthcare managers and professionals. In Wales, patient-reported measures are accessible in dashboards at both in aggregated form and at individual level with appropriate access-control. In particular, PROMs are accessible to professionals at the patient level for individual care and decision-making. Patient-reported data are integrated within Electronic Health Records (EHR) allowing for more systematic data collection and use. On the contrary, in the Italian system, web-based platforms of the above-mentioned Observatories were developed exclusively for making aggregated patient-reported data accessible to healthcare providers and managers. This kind of systems are mainly aimed at enhancing managerial decision-making and promoting quality improvement actions (De Rosis et al., 2020). The aggregated data from the Italian Observatories are also accessible using web services, thus allowing healthcare organizations to built their own dashboard or to integrate data with other business intelligence systems of data reporting, analysis and spreading.

Considering these setting, this study uniquely validated the UTAUT construct in two different countries, Italy and Wales, providing cross-cultural insights that further enhance the model's applicability to diverse healthcare settings.

4. Method

The study employs a qualitative methodology, leveraging the UTAUT model to assess the appropriateness and relevance of adopting its traditional determinants as valid conditions under which healthcare professionals and managers utilize user-reported data in their decision-making processes.

This investigation focuses on both facilitators and obstacles to the adoption of such data in a context of data-driven public healthcare systems.

Interviews were employed in a process of face validity, to assess whether the UTAUT model appears to measure what it is intended to measure. This type of validation is concerned with the appropriateness, relevance, and clarity of the items from the perspective of those who are taking or reviewing the questionnaire, such as subject matter experts or potential respondents.

4.1. The UTAUT model

Since being introduced, the UTAUT model has been tested extensively in various fields for analysing users’ acceptance of technology, including in healthcare. Some extensions of the UTAUT models were developed by Venkatesh and colleagues (2011), to integrate expectation-confirmation theory to explain information systems’ usage, and Venkatesh et al. (2012), with the UTAUT2 model, which incorporates three new constructs such as hedonic motivation, price value, and habit into the original UTAUT (Venkatesh et al., 2011, 2012).

The model and its extensions were used to study the attitude of individuals with some technologies, some specific services, or ways of using services. For instance, drawing from the UTAUT model, Kohnke and colleagues (2014) investigated the predictors of the intention to use Telehealth equipment by patients, clinicians, and agency personnel (Kohnke et al., 2014). Rouidi et al. (2022) used both the UTAUT and the Technology Acceptance Model (TAM) models to predict the acceptance behaviour of remote care technologies by health professionals (Rouidi et al., 2022). Wang and colleagues (2020) used the UTAUT and task-technology fit models to understand how consumers accept healthcare wearable devices (Wang et al., 2020). Moreover, some studies focused on the mobile payment context, introducing the concepts of technology reliability and privacy issues (Lee et al., 2019; Slade et al., 2013).

The factors used in this study are the following:

1. performance expectancy, defined as the degree to which using healthcare user-reported data will provide benefits in performing certain activities.
2. effort expectancy, defined as the ease of use of this data.
3. social influence, defined as the degree to which participants believe that others, e.g., colleagues, top managers, and policymakers, believe user-reported data should be used.
4. facilitating conditions, in terms of organizational resources available to support the use of these measures.
5. habit, measuring if the use of patient-reported data is required by the organization, as well as how likely is the use of these data in healthcare professionals' and managers' daily work.
6. perceived security, in terms of data security and privacy law.
7. trust, in terms of value and the role of data in supporting good service delivery and managerial decisions.
8. anxiety, in terms of confidence in the use of these data and/or any platforms reporting these data.

The items used to define the factors were adapted from the literature and used for the interviews.

The first four factors were adapted from Venkatesh et al. (2003; 2011; 2012), Cimperman et al. (2016) and Lee et al. (2019). The factor "habit" was adapted from Venkatesh et al. (2012); "trust" from Venkatesh et al. (2011); "perceived security" and "anxiety" from Cimperman et al. (2016).

4.2. Data Collection

13 semi-structured interviews were conducted with healthcare professionals and managers from Italy and Wales. The interviews explored their perspectives on the determinants of the use of the healthcare service user-reported data, encompassing the adoption of the UTAUT model and its extensions to adapt it to the context of the use of patient-reported measures by healthcare professionals and managers. The interviewees were asked to answer i) general questions on the relevance of the different factors and the completeness of the hypothesized model, ii) specific questions on the items measuring each factor, for evaluating clarity and coverage, as well as length and format of questions, and iii) any examples relating to their practice. Interviewees were called to provide detailed feedback on each item, identifying any questions that seem irrelevant, confusing, or poorly worded. They might suggest rewording, removing, or adding questions to improve the questionnaire's validity.

The characteristics of the participants are reported in Table 1.

Variables		**Categories**	**Values (n)**	**Values (%)**
Country		Italy	6	46%
		Wales	7	54%
Sex		Female	9	69%
		Male	4	31%
Role		Manager with clinical background	5	38%
		Manager with non-clinical background	6	46%
		Clinician	2	15%
Familiarity with user-reported data		Yes, partially	2	15%
		Yes, totally	11	85%
Seniority	Years working in the current position	Less than 3 years	4	31%
		3-5	3	23%
		6-10	2	15%
		More than 10	4	31%
	Years working in healthcare	Less than 5 years	2	15%
		10-20	2	15%
		20-30	6	46%
		More than 30	3	23%
Current use of user-reported data		Yes	11	85%
		No	2	15%

Table 1. Characteristics of participants in the interviews. Source: Authors

5. Results

First, the findings of this study confirm the validity of the model in the context of the public healthcare sector. The participants validated the importance of the proposed factors as the main determinants of the use of healthcare user-reported data, as well as the model's completeness, without the need to add new factors to cover missed areas.

The questionnaire was revised to address feedback about some of the wording used. This involved rewriting questions for clarity and removing items that did not seem relevant.

Specifically, the "performance expectancy" factor remained consistent with the proposed scale, adapted on the basis of the previous studies applying the UTAUT model, retaining its five statements.

In contrast, the "effort expectancy" factor was reduced from four to two statements. This decision was based on feedback received from interviewees who felt that "*certain statements are redundant*".

In the "social influence" factor, the references to the "social circle" and "People who are important to me" in the UTAUT model have been deleted ("*The statement is too ambiguous and doesn't fit well in the professional context*", "*The people that are most important to me are outside of the work context*", "*social circle mainly refers to my personal-family sphere*"). Participants underlined the importance of maintaining the organizational level, peers, institutional and external bodies.

The "facilitating conditions" factor was expanded from six to seven statements. The concept of "resources" was declined in material resources, human resources and time ("*Resources is very generic*"). Additionally, "guidance" and "specialized instructions" were incorporated into a single statement ("*These two statements are overlapping*"), which also included the "training" ("*there is an issue with people feeling confident using data, which means that there is a gap in training, knowledge and skills*", "*Often people don't get any training to use these data*", "*training on how to use the software*"). The "habit" factor was reduced from four to three statements because they are considered as being "*redundant*" by the participants.

Concerning "perceived security", professionals underlined the importance to collect and report patient data in a safe way. However, they also suggested to add the focus on data sharing ("*Is sharing safe?*", "*Collection, reporting and sharing. How it was collected and how it was reported is known and where they are shared is not known. With whom? On which sites/platforms?*").

The "trust" factor remained consistent with the proposed scale, adapted on the basis of the previous studies applying the UTAUT model, retaining its four statements. Finally, the "anxiety" factor was better adapted to the study context, following the suggestions of the interviewees.

After revisions, the questionnaire underwent a final review to ensure that it met the expectations for face validity. At this stage, the questionnaire appears to be a concrete, effective and accurate tool for for investigating the factors affecting the uptake of user-reported data in the decision-making processes of public servants, both to experts and to typical respondents (Appendix A).

Second, the interviews allowed in-depth discussion of each factor of the model, to better understand its meaning and the perception of its relevance in the informants' perspectives in two different European countries.

5.1. Is performance expectancy a determinant factor for the use of healthcare user-reported data?

During the interviews, it emerged that performance expectancy plays a pivotal role in determining the utilization of healthcare user-reported data. Participants recognized that performance expectancy serves as a motivating factor, as it directly impacts their decision to engage with user-reported data. Healthcare user-reported data is useful "*to look back at things we have done and look at how we can change things for the future*", "*allows you to […] do the things that are effective*", "*allows you to review and improve productivity based on the experience*", "*to improve the service in line with what the service user wants*", "*to be client-centred*". Healthcare user-reported data were reported by the informants to be useful when consulting with patients; to identify areas where professionals need to focus or the area where patients are most concerned; to ask more direct questions to patients; and to better understand the current medical status of the patient (so both to inform treatment and service delivery). In addition, the informants also recognized the valuable role of user-reported data at the organizational ("meso") level (e.g., for service delivery and service design) and the system ("macro") level (e.g., for monitoring, evaluating and benchmarking the performance results in the user perspective).

5.2. Is effort expectancy a determinant factor for the use of healthcare user-reported data?

Informants emphasised the importance of acknowledging the work required for adopting and utilising user-reported input. They stressed the importance of aligning effort expectations with the goals and objectives of healthcare organizations, considering current constraints and challenges. This alignment not only encourages healthcare providers to actively seek and use patients-reported data, but also ensures that the data loop remains a valuable tool for enhancing the overall quality of healthcare services ("*Having this information available allows me to have a clearer idea of the patient's needs.*"). This factor appeared strictly linked with the technical and digital tools used to collect, access and analyse data. Two aspects emerged as important about this factor: the ease of use of the tool, and the ease of use of the information provided ("*Can you use the information you get from them?*").

5.3. Is social influence a determinant factor for the use of healthcare user-reported data?

The interviews revealed that social influence is a key factor in the use of healthcare user-reported data. Two major influences need to be taken into consideration in their point of view: the organization and the peers. The organizational level refers mainly to managerial mechanisms that are put in place for enhancing the uptake of data in the decision-making processes, such as managerial mechanisms of control (i.e., monitored key performance indicators). Peer-pressure is another factor that was emphasized by informants, referring to the importance of sharing good practices of data interpretation and use among public servants (i.e., into communities of practice), but also mentioning the importance of the reputational levers and the consequent "me too" effect. Furthermore, institutional (i.e., "*national, regional and local healthcare systems*") and external bodies (e.g., "*university*") play a crucial role in stimulating the use of patient-reported data ("*We feel part of a network*"). This demonstrates the importance of considering the close collaborations of healthcare organizations with professional bodies operating at different levels of the healthcare system, or third-party bodies that collaborate and can support organizations in different activities.

Additionally, "*there is a difference between supporting and valuing the use of them".* So, *"it is important to consider also this last aspect*" that refers to acknowledging the efforts of user-reported data uptake into the decisions, with tangible (i.e., goals linked to the additional payment) or intangible benefits (i.e., public recognition during events).

5.4. Are there any facilitating conditions for the use of healthcare user-reported data?

The insights gleaned from these interviews shed light on the significance of having some facilitating conditions within healthcare organizations, and how they influence professionals' and managers' willingness to integrate user-reported data into their practice ("*Without facilitating conditions nothing can be done*"). More specifically, participants prefer to distinguish between material resources (e.g., the "*infrastructures to use them*", "*practical things like computers, pen and paper stamps and/or digital solutions*"), human resources (e.g., a team of people working on collecting and consulting data), and knowledge, which can relate to statistical knowledge (e.g., how to interpret raw data, or how to present results). Informants reported that decision-makers can strongly benefit of data controllers, processors and analysts to effectively use these data. Another key aspect of this factor focuses instead on the ability of patient data to be complementary with other measures and systems used by the organization. In this sense, for healthcare professionals, the possibility of using this information collected together with others, to have a more complete vision, appears to be an aspect to take into account.

Moreover, the participants highlighted that time is considered a big barrier, and it needs to be taken into consideration together with the other types of resources ("*for example, I've got the equipment, I haven't got the time, or I've got the equipment and the time, or I haven't got the equipment, and I haven't got the time*"). The results also confirmed the importance of having some support (a specific person or group available for assistance) as well as guidance, specialized instructions and/or training, since new skills and competences are to be established and nourished for an effective data-driven decision-making.

5.5. Is habit a determinant factor for the use of healthcare user-reported data?

The interviews revealed that mandating the use of patient data, as well as the practice of using it in professional activities, are two critical components. On the one hand, the organization's external obligation is a factor that positively influences the application of patient-reported data in work activities just because it makes it a mandatory activity. This can encourage even the most sceptical public servants to use these data. On the other side, the professionals need to appreciate the use of these data for this practice to become habitual because “they are relevant to my work”, “*they serve for own working activities*”. A cultural factor emerged in the words of informants, underlining the need to really persuade public servants to understand the value and the power of these data for improving and informing their decision-making processes.

The informants emphasized again the need of digital platforms and systems for supporting the use of these data to become a habit: “*a good IT system, automated, is crucial to the long-term success and the sustainability of continually collecting*”.

5.6. Is perceived security a determinant factor for the use of healthcare user-reported data?

Interviews confirmed that perceived security is a determining factor when it comes to the use of patient-reported data. User-reported data must be collected, reported, and shared securely. The informants highlighted the need of secure the digital tools for collecting and reporting these data, as well as the need to be compliant with data protection and privacy laws. Informants reported a concern about the proper safeguard of such data. This emerged as particularly important when informants discussed about user-reported outcomes of the public healthcare service, which of course relate to quality of life and health-related aspects that may be very sensitive information. These considerations may result in the implementation of additional protective measures that have always been deemed legitimate by the informants but have sometimes been cited as barriers to the collection and use of such data. In their point of view, this could further incentivize managers and professionals to opt for handling data that are simpler to collect and manage, potentially resulting in inequities or distortions.

This aspect implied the reflection on the different ways that can support a compliant data collection, storage and use in this delicate public sector, stressing the importance of digitalizing the tools along the data management chain: “*the paper-based collection is the least secure*”.

5.7. Is trust a determinant factor for the use of healthcare user-reported data?

Trust in user-reported data appears a key determinant. More specifically, knowing that user-reported data is high-quality and well-validated information is an important consideration: “*Managerial team can make decisions knowing that the information is accurate and relevant*”.

Participants also underlined that data must be able to be translated into actions and play a supporting role in the good provision of services, and managerial decisions. This moves the trust on the level of potential impact of a data-driven public sector, since this approach support a more inclusive and trusted design, delivery and monitoring of public policies and services through the management, sharing and use of these data.

5.8. Is anxiety a determinant factor for the use of healthcare user-reported data?

According to interviewees, not feeling comfortable using patient input can be a barrier. This concern is especially appropriate "*for those who do not use the data"* and are unfamiliar with them.

The items used to define the factors were slightly modified based on the results of the interviews. The informants suggested to further investigate how the importance of the different factors above-mentioned can vary for different data-users or decision-makers, and for different user-reported data types. They also emphasized again the potential role that different types of digital platforms can play in determining the impact of these factors, since they were using different digital tools for user-reported data collection, monitoring and consultation, both in Wales and Italy.

6. Discussion

Data-driven decision-making is fundamental for modernizing public administration. The digital transformation generates vast amounts of data and promotes their intensive use, presenting both opportunities and challenges for public organizations in creating public value. This study provides an adapted version of the UTAUT model for investigating barriers and facilitators of user-reported data uptake in the decision-making processes of public servants. The revised questionnaire needs go through statistical validation to ensure the factors' validity. Specifically, a subsequent phase of this study will focus on data collection with the adapted questionnaire. A principal component analysis (PCA) will be conducted to assess resulting factor structures, while linear regressions will be conducted to analyze the effect of these factors on the intention to use patient data of healthcare professionals and managers. Finally, a third part of the study will apply this methodology to the evaluation of different patient-data reporting web systems in the two countries under investigation.

Integrating the results of the study with the broader framework of data-driven decision-making in public administration underscores the complexities and opportunities associated with leveraging healthcare user-reported data.

The study emphasizes that performance expectancy is a key determinant in the use of healthcare user-reported data, which is consistent with the broader narrative on data-driven public administration. As digital transformation continues to generate vast amounts of data, the ability to effectively utilize this data and really affect practice is critical as also suggested by Androniceanu (2023). Participants in the study recognized that user-reported data is valuable for improving services and aligning them with user needs, a perspective that aligns with the OECD's definition of a data-driven public sector where data is seen as a strategic asset for policy-making and service design (Ubaldi & Okubo, 2020). The emphasis on using data to improve service delivery highlights the importance of integrating user perspectives into decision-making, which is central to modern public administration practices.

Effort expectancy, particularly regarding the ease of use of data collection and analysis tools, is another critical factor identified in the study. This finding aligns with the broader challenges in data-driven public administration, where technical tools and digital platforms play a crucial role in facilitating data use making easier access, consultation, reading and interpretation. The study participants' focus on the ease of use of both the tools and the data itself reflects the need for intuitive digital solutions that streamline bureaucratic processes and reduce costs (Valle-Cruz & García-Contreras, 2023). This is particularly important in overcoming barriers to data adoption, as highlighted by van Ooijen, Welby, & Ubaldi (2019), who noted that technical infrastructure is essential for embedding data-driven practices within public organizations.

The study's findings on social influence emphasize the importance of organizational culture and peer support in promoting the use of healthcare user-reported data, as well as the existence of organizations and institutions external to the organization that may have an impact on the decisions of healthcare professionals. This is consistent with research by Choi et al. (2021) and Cantarelli et al. (2023), which underscores that the success of data-driven decision-making hinges not only on technical factors but also on organizational aspects such as stakeholder cooperation and a supportive culture. The study highlights that managerial mechanisms and peer pressure can drive data usage, reinforcing the idea that fostering a data-driven culture requires both top-down support and grassroots engagement within organizations. In considering external influences, it is imperative to acknowledge the role of collaboration with research institutions and universities, as such partnerships can significantly drive innovation. Additionally, it is essential to recognize the critical importance of the political and policy context, which is characteristic of numerous public services, including healthcare services. The study identifies facilitating conditions, such as the availability of resources and infrastructure, as critical to the successful integration of user-reported data. This finding resonates with the broader literature on data governance in the public sector. Robust data governance structures are necessary to capitalize on the value of data across the public sector (Ubaldi & Okubo, 2020). The need for adequate resources, including material and human resources, as well as time and knowledge, reflects the complex, non-linear approach required to embed data-driven practices within public organizations, as described by van Ooijen, Welby, & Ubaldi (2019). Without these facilitating conditions, the potential of data-driven decision-making to improve service delivery and innovation can be significantly diminished.

The study's emphasis on habit formation highlights the importance of making the use of user-reported data a regular practice within public organizations. Mandating the use of such data and integrating it into routine activities can drive its adoption, even among those initially resistant. This aligns with the broader goal of institutionalizing data-driven practices within public administration, where sustained use of data is crucial for long-term success. The emphasis on digital platforms and automated systems as tools to support habitual data use reflects the ongoing digital transformation in the public sector, which aims to make data use both sustainable and scalable (Valle-Cruz & García-Contreras, 2023).

The study confirms that perceived security and trust are fundamental to the effective use of healthcare user-reported data. Concerns about data security and privacy are critical in the public sector, where data governance must ensure compliance with data protection laws and ethical standards. This finding is particularly relevant in light of challenges related to data sharing, interoperability, and maintaining high standards of data quality, as noted by van Ooijen et al. (2019). Trust in the quality and relevance of data is essential for it to be used effectively in decision-making processes, a point emphasized by both the study participants and existing literature.

The study's insights into the ethical considerations surrounding data use, such as the risk of over-surveillance and the potential for data collection to exacerbate inequalities, align with broader concerns in the literature. While data-driven decision-making can empower marginalized groups and improve service delivery (Hepburn, 2018), it also poses risks if not managed carefully, , because some individuals may have low level of digital competencies especially when coping with grand adults (Vainieri et al., 2023).

Privacy issues are perceived as relevant and critical, since they can create tensions among different values (i.e., data protection versus transparency or research-driven use of data). However, studies on this topic are still scarce and need to be investigated. Moreover, the study's participants highlighted the importance of secure data practices and the need to balance the benefits of data use with its potential to create inequities or distortions, particularly in sensitive areas like healthcare. This reflects the broader discourse on process equity, where the ethical implications of data use must be carefully considered to avoid negative outcomes such as the "chilling effect" described by Brayne (2017).

This study is part of ongoing research that aims to explore further the impact of standardized versus locally developed measures, the role of national benchmarking programmes, and the use of different digital platforms in facilitating the use of patient-reported data. These future directions are crucial for understanding how to optimize the use of user-reported data in public healthcare and other sectors. Investigating the determinants of data-uptake in decision-making processes can inform strategies and interventions to promote the effective use of patient-reported measures, ultimately enhancing service quality and patient-centred care. Standardization can help address issues of data quality and comparability, while the use of advanced digital platforms can enhance the efficiency and effectiveness of data-driven decision-making. The integration of experience and outcome measures, as well as the focus on patient-centered care, reflects the broader trend towards more personalized and responsive public services, as advocated by Moore (2012).

7. Conclusions and implications

This study aims to provide valuable insights into the factors that facilitate or hinder the utilization of user-reported data within healthcare organizations.

The results of the interviews confirm the importance of the hypothesized factors as the main determinants of the use of patient-reported data within healthcare organizations. This insight can be useful to stimulate the use of these measures by managers and healthcare professionals and overcome barriers to adoption.

The findings of this study reinforce the importance of several determinants in the successful adoption of healthcare user-reported data in public administration. These determinants—performance expectancy, effort expectancy, social influence, facilitating conditions, habit, perceived security, trust and anxiety—are all critical in fostering a data-driven culture within public organizations.

Integrating these factors into data governance strategies for supporting the use of data in public organizations is essential for modernizing public administration and realizing the full potential of data-driven decision-making to improve service delivery, innovation, and public value creation.

The integration of the study's findings with existing theories on data-driven public administration highlights the multifaceted challenges and opportunities associated with the use of user-reported data. As digital transformation continues to reshape public administration, the successful integration of user-reported data will require a comprehensive approach that addresses both technical and organizational challenges. By understanding these determinants and investigating them with the model proposed in this study, public organizations can develop strategies to effectively leverage user-reported data, ultimately enhancing service quality, equity, and accountability in the public sector.

8. Ethics

Approved by the Swansea University Faculty of Humanities and Social Sciences Research Ethics Sub-Committee.

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