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Dental Impressions: Evidence-Based Clinical Decision-Making Strategies in the Context of Artificial Intelligence

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Abstract: ***Materials and Methods:*** *This paper approaches a cross-sectional study that used a structured online questionnaire with 16 items, distributed to dentists in the Oltenia region of Romania along with a bibliometric section on Conceptual and Cognitive Frameworks for Clinical Decision-Making in Digital Dentistry and the role of Artificial Intelligence. The empirical study collected demographic data and assessed the use of conventional and digital impression techniques, perceived advantages and limitations, professional satisfaction and attitudes towards future technological integration. Statistical analyses explored the associations between clinician characteristics, technology use and decision-making preferences.* ***Results:*** *Digital impression techniques were accepted, especially among urban dentists aged 36 to 45. Their use was associated with greater clinical accuracy, improved patient comfort, and significant professional satisfaction. Experience with digital technologies significantly influenced physicians' willingness to adopt and recommend digital workflows, highlighting the role of human-technology interaction in clinical decision-making.* ***Conclusions:*** *Digital impressions are key components of emerging dental workflows, supported by artificial intelligence, improving decision-making and practice efficiency. Conventional impression techniques remain essential in certain clinical contexts due to their proven reliability.*

Keywords: *conventional impression techniques; digital impression techniques; clinical decision-making; artificial intelligence in dentistry; intraoral scanner; questionnaire.*

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1. Introduction

Dental impressions are a fundamental step in the organisation and execution of dental treatments, directly influencing the adaptation, stability and functionality of restorations (De La Cruz et al., 2002; Khan et al., 2021; Wong, Nedelcu, & Hamilton, 2025). Technological developments in dentistry have led to unprecedented changes in impression techniques, essential for obtaining high-precision prosthetic restorations and optimal functional adaptability (Millar, 2001; Al-Odinee et al., 2020; Tamini & Hirayama, 2019; Naderi, Patel, & Thompson, 2024; Alqutaibi, Alghauli, & Aboalrejal, 2024; Alfaraj et al., 2025; Reis et al., 2025), also taking into account the precision of the impression which influences the fidelity of the replication of the dental arches and adjacent structures, this being a determining factor in obtaining optimal clinical results (Christensen, 2008; Burzynski et al., 2018; Punj, Bompolaki, & Garaicoa, 2017; Runkel et al., 2020; Flügge et al., 2018; Park et al., 2025; Mahmoud, Hakim, & Rady, 2025; Bandiaky et al., 2022; Farzin et al., 2020; Pozzi et al., 2025).

When choosing an impression technique, the needs of each patient and the complexity of each clinical case must be taken into account. Conventional and digital impression techniques play essential roles in contemporary dentistry, with each method having specific advantages and directly influencing the quality of the final result. The traditional impression technique has been considered the gold standard in dentistry, using materials such as alginate, polyvinyl siloxane, and polyether to capture the anatomical details of the oral cavity (Benic et al., 2016; Sedky & Abd-Elwahab Radi, 2020; Gartshore et al., 2025; Jánosi et al., 2023; Chen et al., 2021; Abuduwaili et al., 2025; Siqueira et al., 2021). The materials detailed above have been improved over time to provide greater dimensional stability and increased accuracy, but their physicochemical characteristics impose certain limitations (Basker, Davenport, & Thomason, 2011; Ribeiro et al., 2025). The development of digital impression techniques has opened up new perspectives in modern dentistry. This method uses high-precision intraoral scanners that generate three-dimensional models of the dental arches, thus eliminating the need for conventional impression materials. The integration of this technology into dentistry has led to workflow optimisation, including reduced execution time and improved patient comfort. In addition, digital impression techniques offer electronic data storage, facilitating efficient communication with dental laboratories, thus reducing the risk of degradation or loss of conventional impressions (De La Cruz et al., 2002; Khan et al., 2021; Wong, Nedelcu, & Hamilton, 2025). In medical practice defined by accelerated digitalisation, it is essential to determine optimal use scenarios and assess the extent to which digital innovations can replace or complement traditional methods. A thorough examination of these techniques is necessary to lead to a scientific, evidence-based framework that facilitates informed decision-making in routine clinical practice (Megremis et al., 2012; Kim, Park, & Shim, 2018; Rutkūnas et al., 2023; Park, Kim, & Lee, 2020; Alenezi, Yehya, & Alkhodary, 2022; García-Gil et al., 2020; Zarbakhsh et al., 2021). Thus, it is useful to identify the strengths and limitations of each method in order to develop optimal clinical strategies adapted to the parameters of each case (Basker, Davenport, & Thomason, 2011; Ribeiro et al., 2025; Giachetti et al., 2020; Kihara et al., 2020; Miranda Ataíde et al., 2025; Giuliodori, Rappelli, & Aquilanti, 2023; Albayrak et al., 2021; Jaiswal et al., 2025; Albanchez-González et al., 2022; Hasanzade et al., 2021; Hasanzade et al., 2019; Porto et al., 2025; Lo Russo et al., 2019; Manisha et al., 2023; Mahat et al., 2023). As digitalisation advances in the medical field, especially in dentistry, dental impression methods must now be viewed not only as simple technical procedures, but as integral components of complex systems of human-technology interaction that have a significant impact on clinical decision-making strategies.

The operational throughput for digital impressioning depends on data collection, immediate visual feedback, and algorithm-based processing, positioning them within new clinical biospheres designed by artificial intelligence (Topol, 2019; Shortliffe & Sepúlveda, 2018). The clinician's choice of impression method is not only a matter of technical aspects but also of resource accessibility, mental factors, including perceived accuracy, confidence in decisions, reduced workload, and reliance on digital systems (Yuzbasioglu et al., 2014; Róth et al., 2020; Bernburg et al., 2025). Most existing research continues to focus predominantly on technical accuracy and clinical outcomes, with limited empirical data addressing how digital impression technologies are integrated into evidence-based decision-making processes in routine dental practice (Ahlholm et al., 2018; Papaspyridakos et al., 2020). The complexity of the clinical case, the available resources, the patient's and the doctor's preferences are factors that underlie the choice between the two techniques. Conventional impression techniques remain a valuable and indispensable option in many clinical contexts, due to their proven effectiveness over time, although digital methods are more frequently adopted due to their well-known advantages (De La Cruz et al., 2002; Khan et al., 2021; Wong, Nedelcu, & Hamilton, 2025; Bandiaky et al., 2022; Târtea et al., 2024; Târtea et al., 2024). Therefore, the impact of digitalisation on contemporary dentistry goes beyond impression-taking. A comprehensive study of the differences between conventional and digital impression techniques is essential for optimising therapeutic strategies and improving the patient experience, as it is added to the diagnosis and various treatments, including digital design in specialised CAD software, in the realization of dental restorations using dental CAM software but also dedicated production equipment, as well as the assessment of the quality of these restorations before clinical use (Popescu et al., 2024; Lee, Macarthur, & Gallucci, 2013; Ciocan et al., 2025). The present study aims to compare conventional and digital impression techniques, highlighting the advantages and limitations of each and their implications for the clinical and long-term success of prosthetic restorations. The study also aims to deepen the understanding of the efficiency and applicability of each method, and to contribute through a solid scientific basis for the optimal selection of the impression technique according to the individual characteristics of each patient.

2. Comprehensive Methodological Framework

2.1. Conceptual and Cognitive Frameworks for Clinical Decision-Making in Digital Dentistry and Artificial Intelligence

2.1.1. A Sociotechnical Perspective on Digital Dentistry

In the field of digital dentistry, a type of socio-technological system is envisaged, in which clinical performance and treatment outcomes are derived from the active interaction between human operators, digital technologies and the organisational environment, and not just from isolated technical methods, therefore digital technologies do not serve only as neutral tools, but actively influence clinical workflow, information management and decision-making practices. The perspective described above, initially generated to investigate complex work systems, highlights the technology that cannot be separated from human understanding, skills and contextual elements that affect its use (Carayon et al., 2006; Baxter & Sommerville, 2011).

In contemporary dental practice, digital impressions constitute a critical window between clinicians and digital technologies, transforming the way clinical information is acquired and evaluated. Conventional techniques that rely on manual skills and tactile experience are established, however digital systems offer continuous visual feedback, algorithm-based data processing, and structured guidance, with implications that extend beyond technical accuracy to the cognitive and organisational dimensions of practice (Topol, 2019). The clinician will remain an active decision-maker, corroborating digital results with clinical judgement, while managing the new cognitive demands related to interface navigation, data interpretation, and trust in algorithmic results.

Current studies in medical informatics indicate that misaligned human-technology interactions can increase cognitive workload and affect decision quality, even when technological accuracy is above standards (Carayon et al., 2014; Shortliffe & Sepúlveda, 2018). In digital dentistry, innovations such as intraoral scanners and CAD/CAM systems are shifting physicians' procedural functions from manual execution to assessment and interpretation tasks, improving clinical effectiveness, confidence in decision-making, and job satisfaction. Research from all medical fields, including dentistry, indicates that technology adoption is a factor dependent on the congruence between digital tools and physicians' cognitive processes, professional standards, prior experience, training, and organisational context (Ahlholm et al., 2018; Bernburg et al., 2025). Evaluating digital dentistry requires a socio-technical perspective that goes beyond technical performance to include human factors, cognitive adaptation, and systems integration. Thus, digital impression methods assume a fundamental role in shaping AI-driven clinical environments, as they directly impact clinical reasoning and workflow, despite the opacity of the underlying computational processes. This perspective provides a solid foundation for understanding how digital impression technologies support evidence-based decision-making and enable more advanced AI-assisted dental applications.

2.1.2. Clinical Decision-Making in Technology-Enhanced Care

In the medical field, therapeutic conduct formulation is increasingly understood as a complex cognitive process, shaped by perceptual inputs, contextual constraints, time pressure, and interaction with technological systems, rather than as a purely deterministic act. In this context, digital impression technologies are reshaping clinical reasoning, providing continuous visual feedback, algorithmically processed data, and system-mediated cues that actively support therapeutic conduct (Shortliffe & Sepúlveda, 2018).

From a cognitive perspective, digital impression systems function as assistive environments in which clinicians integrate system-generated information with professional judgement, shifting cognitive effort from manual execution to interpretive assessment. Compared to conventional impression techniques—where decisions are largely based on prior experience, tactile feedback, and post-procedural assessment—digital workflows allow for real-time assessment of scan accuracy and surface integrity, allowing for immediate correction and earlier, better-informed clinical decision-making (Yilmaz et al., 2021). The effectiveness of these systems can reduce procedural variability and increase confidence in decision-making, but they depend on interface usability, transparency, and perceived reliability. Clinical reasoning is mediated by trust and time efficiency through the impact of digital impression technologies, such that the combined result of algorithm results and clinical expectations is associated with higher adoption rates, professional satisfaction, and willingness to recommend digital workflows. The limitations of these technologies are the opaque behaviour of the system that could reduce trust and lead to a return to conventional methods (Ahlholm et al., 2018; Bernburg et al., 2025). In addition, the reduced time spent in the office and immediate feedback alleviate the cognitive pressure of time, reinforcing the role of digital impression (Siqueira et al., 2021).

Figure 1 summarises the interactions presented above, conceptualising digital impression workflows as a technology-enabled decision-making framework, in which intraoral scanners serve as data acquisition interfaces, algorithmic processing provides real-time feedback, and clinicians remain the central decision-makers. Overall, digital impression technologies exemplify the broader transition to technology-assisted clinical practice in dentistry, influencing not only data quality but also cognitive processes, professional confidence, and workflow efficiency—key considerations for the development of future AI-enabled dental systems.

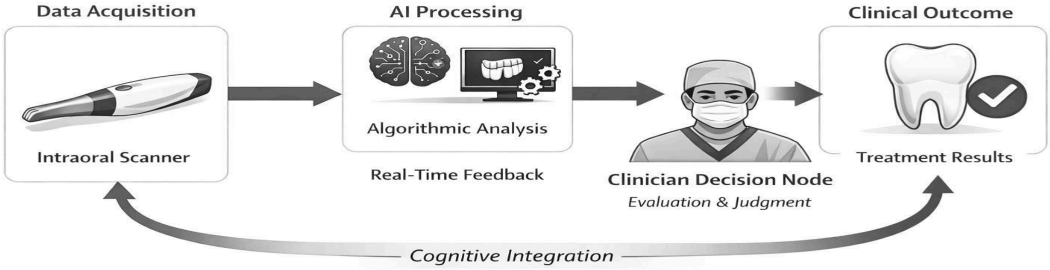

Figure 1. Technology-assisted clinical strategies in digital dentistry
Source: Authors' own elaboration

2.1.3. Cognitive Load Theory in Human–Computer Interaction

Cognitive Load Theory (CLT) provides a solid theoretical foundation for investigating how digital technologies affect human performance by altering the mental resources required to process information and perform complex tasks. Originally generated in the field of educational psychology, CLT suggests that human working memory has a limited capacity and task performance is significantly influenced by the way information is organised and displayed (Sweller, Ayres, & Kalyuga, 2019). In clinical settings, where decisions are frequently made under time constraints, uncertainty, and cognitive load management are crucial to ensure decision accuracy and minimise the likelihood of errors. In the study of human-computer interaction, cognitive load is typically conceptualised as consisting of three distinct components:
1) intrinsic load, related to task complexity;
2) extrinsic load, generated by suboptimal interface design;
3) pertinent load, associated with cognitive processes that support learning and schema formation.

Digital clinical models can reduce or increase cognitive load depending on their integration with users' cognitive capabilities (Paas & van Merriënboer, 2020). In the field of digital dentistry, intraoral scanning supports cognitive effort by transforming manual impression procedures into visually guided, system-assisted tasks. Compared to conventional methods, digital workflow could reduce intrinsic and extrinsic load through automation and real-time feedback, while increasing relevant load through the need to interpret three-dimensional models and algorithm-generated results (Hollender et al., 2010). Consistent findings from human-computer interaction research further demonstrate that interface characteristics—such as visual clutter, feedback latency, navigation complexity, and information density—critically influence cognitive load and task performance.

In healthcare systems, inadequately designed interfaces are linked to heightened cognitive load and diminished decision-making quality, despite the underlying algorithms functioning correctly (Endsley, 2017). On the other hand, intuitive interfaces that aid perceptual grouping and gradual revelation of information can promote cognitive integration and improve clinical performance.

As shown in Figure 2, digital impression processes can be understood as a feedback-oriented human-computer interaction system focused on working memory. In this model, intrinsic load relates to the complexity of tasks and the demands of three-dimensional visualisation, extraneous load arises from the complexity of the interface and delayed or unclear feedback, while germane load is facilitated by meaningful error indicators, scan completeness signals, and adaptive guidance from the system. The clinician functions in a constant feedback loop, merging visual and algorithmic data with expert knowledge to aid immediate decision-making

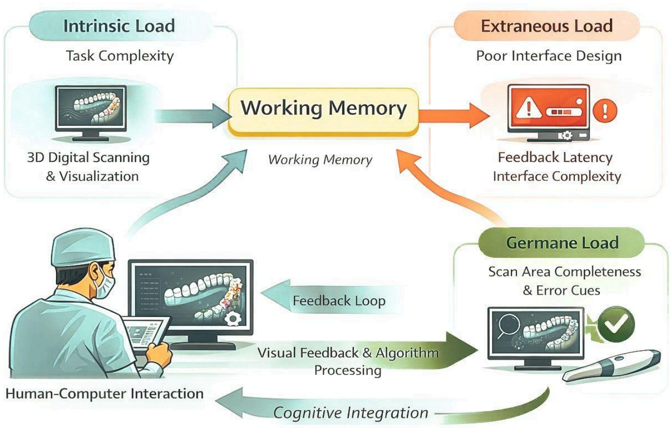

Figure 2. Cognitive load theory applied to human-computer interaction in digital dentistry (author's own conceptual illustration)

Utilising CLT in digital impression technologies emphasises the significance of ergonomics and usability in influencing clinicians' experiences and their acceptance of technology. Visual markers that clearly differentiate scanned from unscanned areas, discrete error alerts, and procedurally aligned feedback can help manage cognitive load and optimise clinical workflows, especially as digital dentistry progresses towards AI-integrated systems with predictive and semi-autonomous functions.

In conclusion, cognitive load theory provides a significant perspective in examining digital impression technologies beyond technical accuracy, emphasising the alignment between system design and human cognitive capabilities to support safer, more efficient, and cognitively informed clinical decision-making.

2.1.4. Digital components and artificial intelligence systems-analogs

Current developments in artificial intelligence research increasingly emphasise hybrid models, in which artificial intelligence systems augment, rather than replace, human expertise through continuous interaction. Thus, digital clinical technologies can be understood as distributed cognitive systems, where intelligence emerges from the interaction between human agents and computational components, rather than residing exclusively within the algorithms (Dellermann et al., 2019; Kamar, 2016). This framework provides a valuable lens for interpreting digital dentistry beyond conventional tool-centric approaches.

For digital impression taking, intraoral scanners function as intelligent sensing elements that acquire and preprocess high-dimensional visual data, performing computational operations analogous to the first steps of artificial intelligence processes, such as feature extraction and spatial reconstruction. Although they do not exhibit autonomous reasoning, these technologies act as cognitive amplifiers that extend the perception and evaluation capabilities of clinicians.

Within this system, clinicians remain adaptive decision-makers integrating system-generated information with contextual understanding, clinical expertise, and ethical judgement, consistent with hybrid intelligence theories that combine human interpretive strengths with computational efficiency and reliability (Friedman & Hendry, 2019; Akata et al., 2020).

CAD/CAM systems further exemplify this hybrid intelligence model by supporting semi-automated optimisation processes while maintaining oversight and accountability by clinicians. These systems function as decision support subsystems that reduce cognitive load and procedural variability, reflecting broader trends towards AI-assisted medical care (Topol, 2023).

Digital dentistry constitutes a fundamental platform for future AI-augmented clinical environments, providing a robust conceptual basis for anticipating the cognitive, ethical, and organisational implications of deeper integration of AI into dental practice.

This framework emphasises interaction, augmentation, and shared cognition instead of just automation, aligning well with current AI research and aiding the creation of clinically significant, cognitively sustainable digital health technologies.

2.2. The Role of Artificial Intelligence in Digital Impression Workflows

Artificial intelligence increasingly supports digital healthcare technologies via embedded computational processes that function primarily beneath the clinician’s conscious awareness. In digital dentistry, impression workflows illustrate this model, with numerous AI-related functions embedded at the system level instead of being offered as clear decision-making entities. Recognising the significance of artificial intelligence in digital impression systems necessitates shifting attention from explicit automation to subtle algorithmic support functions that improve data quality, workflow efficiency, and clinical dependability.

2.2.1. Implicit Artificial Intelligence Functions in Digital Impressions

Digital impression systems incorporate forms of implicit artificial intelligence that improve clinical performance without requiring direct user interaction. This system indirectly contributes to determining therapeutic conduct, being an autonomous system, being integrated into proprietary

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software, operating constantly during data acquisition and processing, supporting physicians by stabilising input data, reducing noise and maintaining the consistency of the internal model.
Real-time algorithmic processing during intraoral scanning, where incoming visual data is constantly analysed to detect discrepancies, incomplete surface captures, and motion artefacts, are central features of this implicit AI. Pattern recognition and anomaly detection, applied in narrow, task-specific contexts, resemble core AI functions (LeCun, Bengio, & Hinton, 2015). The invisibility of these processes influences clinician engagement and trust, as systems are perceived as reliable tools rather than autonomous pawns. Findings from the adoption of medical technology suggest that such "silent AI" is more readily accepted in clinical practice than overt automation, especially in areas characterised by high professional responsibility (Sculley et al., 2015; Amann et al., 2020).

2.2.2. Algorithmic Processes Enhancing Clinical Accuracy

Clinical accuracy and precision in digital impression workspaces is supported by a sequence of algorithmic processes that iteratively manage data acquisition and model generation to optimise geometric accuracy, surface continuity, and spatial consistency while reducing clinically relevant distortions. These processes are summarised in Figure 3, which illustrates the role of pattern recognition, noise reduction, and three-dimensional surface reconstruction in obtaining accurate digital impressions (adapted from Ma et al., 2021). Image reconstruction algorithms provide a critical foundation by converting sequential 2D image frames into coherent 3D surface models through computational geometry and probabilistic matching. Advances in deep learning and computer vision have significantly improved the robustness of reconstruction, especially under challenging intraoral conditions such as variable illumination, reflective surfaces, and limited scanning angles (Ma et al., 2021). At the same time, noise reduction algorithms filter out artefacts caused by saliva, patient motion, and optical interference, preserving clinically relevant features, increasing model clarity and reproducibility (Goodfellow, Bengio, & Courville, 2016). Furthermore, surface matching and registration algorithms further ensure the precise integration of scanned regions into a unified digital model by constantly monitoring spatial alignment and flagging deviations beyond acceptable thresholds. These algorithmic safeguards illustrate how artificial intelligence improves clinical accuracy through cumulative, system-wide effects rather than isolated decision-making outcomes, reducing uncertainty and variability across the entire digital workflow and supporting downstream CAD/CAM accuracy.

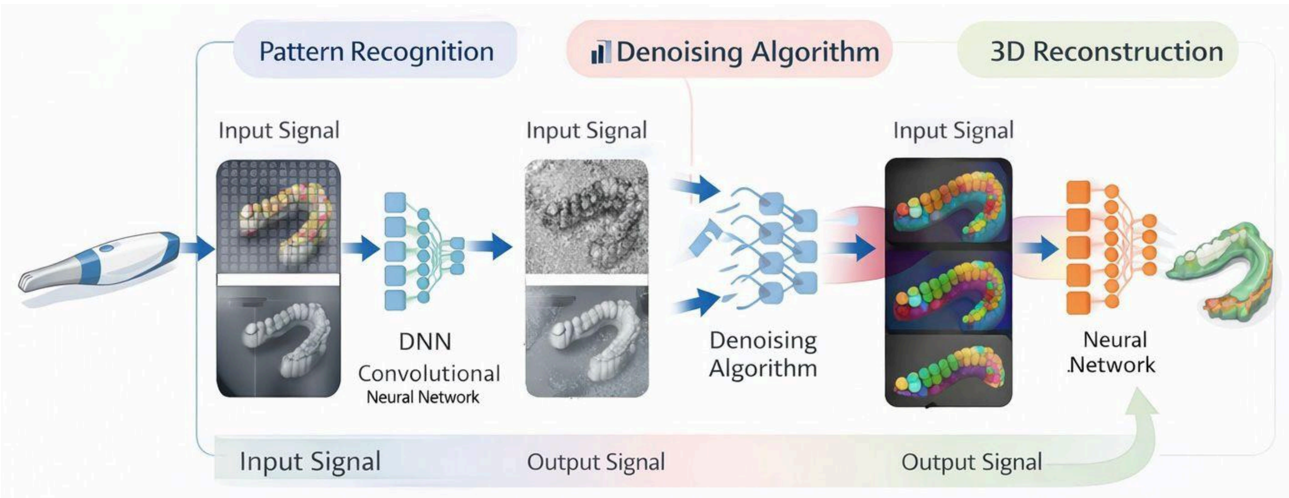

Figure 3. Algorithmic processes supporting clinical accuracy in digital impression workflows, including pattern recognition, noise reduction, and three-dimensional surface reconstruction (adapted from Ma et al., 2021)

2.2.3. Digitisation and Intelligent Automation: A Comparative Perspective

When assessing the role of artificial intelligence in digital dentistry, a clear conceptual distinction is needed between digitisation and intelligent automation. Digitisation refers to the conversion of analog processes into digital formats for storage, visualisation, and exchange, while intelligent automation involves adaptive algorithms that improve processes, detect errors, and support therapeutic behaviors beyond the simple display of data (Parasuraman, Sheridan, & Wickens, 2000). Digital impression models occupy an intermediate position on this spectrum: although they represent a significant advance over analog techniques, they do not constitute fully autonomous AI systems, instead integrating selective elements of intelligent automation—such as real-time error detection and algorithmic feedback—within predominantly human-controlled workflows. Substantial clinical benefits are provided by improving efficiency and accuracy, while maintaining clinician autonomy and accountability. Evidence from human-automation interaction research suggests that such balanced automation is associated with better performance and fewer automation-related errors than purely manual or fully autonomous systems (Endsley & Kiris, 1995; Riveiro, Falkman, & Thorslund, 2018).

From an ethical perspective, maintaining this balance is particularly important in the medical field, where excessive automation can obscure accountability and insufficient automation can reduce technological potential. As AI capabilities continue to evolve, understanding the distinction between digitalization and intelligent automation provides a critical framework for assessing future developments in digital dentistry.

2.3. AI-Based Reinterpretation of Materials and Methods

The theme of this study uses a structured questionnaire, in which the data collected goes beyond a descriptive assessment of clinical preferences. Interpreted through the lens of the integration of artificial intelligence and decision science, the questionnaire functions as an indirect method of clinicians' interaction with digital systems, technology acceptance, and cognitive adaptability in technology-enhanced clinical environments. This perspective links the empirical methodology of the study with contemporary artificial intelligence-oriented models used to analyse human-technology interaction in dentistry, thus strengthening the conceptual alignment between the methods and the broader theoretical framework of the study.

2.3.1. Questionnaire as an Instrument for Technology Acceptance Assessment

Adoption of technology systems is widely recognised as a determinant of digital innovation in medicine in general, often surpassing technical performance in predicting real-world adoption. In AI-based clinical cases, acceptance depends not only on the perceived accuracy of the system, but also on ease of use, trust, professional identity, and compatibility with existing workflows (Holden & Karsh, 2010; Venkatesh, Sykes, & Zhang, 2016). The questionnaire used in this study can be interpreted as a multidimensional tool that captures key components of technology adoption. Items addressing benefits, limitations, and job satisfaction reflect clinicians' assessments of the system's usefulness and ease of use, while questions about willingness to adopt or recommend digital impression methods provide information about behavioural intention—a central predictor of sustained technology use in healthcare and artificial intelligence implementation models.

The acceptance of technology in digital dentistry is an active, dynamic process shaped by experience and contextual factors rather than a fixed attribute. Thus, questionnaire-based assessments provide a meaningful index for understanding how clinicians cognitively integrate digital technologies into routine decision-making, particularly in contexts where direct measurement of cognitive processes cannot be practiced. Robust reports from the fields of digital health and clinical informatics indicate that perceived use, workflow alignment, and professional autonomy strongly influence the acceptance of AI-assisted tools, even when objective accuracy is high (Shevtsova et al., 2024).

2.3.2. Operational Mapping to TAM and UTAUT Frameworks

Clinician responses to these technologies described above can be more effectively interpreted by situating the results in the context of established technology adoption frameworks. The Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) are complementary models widely applied in medical and artificial intelligence research, providing a structured basis for understanding how professionals evaluate and integrate digital impression systems into clinical workflows.

Table 1 summarises a comparative overview of these complementary models, based on their original formulations and subsequent applications focused on the healthcare field.

TAM conceptualises technology adoption through individual cognitive assessments. In digital dentistry, these models address clinicians' perceptions of improved accuracy, workflow efficiency, patient comfort, and the effort required to learn and operate digital impression systems. TAM is particularly well-suited to explaining adoption in early stages, where personal attitudes and perceived benefits strongly shape behavioural intention (Davis, 1989; Holden & Karsh, 2010). On the other hand, UTAUT is extended beyond individual cognition by incorporating social, organisational, and contextual determinants such as performance expectations, enabling conditions, and social influence, which are highly relevant in complex clinical environments (Venkatesh et al., 2003; Kijsanayotin et al., 2009). Research on digital health and AI adoption reveals that TAM and UTAUT operate at different but complementary analytical levels, with TAM capturing individual acceptance and UTAUT providing greater explanatory power in integrated organisational contexts (Scherer, Siddiq, & Tondeur, 2019; Venkatesh, Sykes, & Zhang, 2016).

In digital dentistry, integration decisions are shaped not only by personal experience but also by external factors such as institutional support, training availability, costs, and professional norms. Aligning the questionnaire items in the present study with both frameworks allows for a two-level interpretation of the results: satisfaction, perceived accuracy, and recommendation intentions align with TAM constructs, whereas UTAUT more effectively elucidates demographic variables and reported barriers to adoption.

*Table 1. Comparative analysis of TAM and UTAUT models in the context of digital dentistry (*Venkatesh, Morris, Davis, & Davis. *)*

Dimension	Technology Acceptance Model (TAM)	Unified Theory of Acceptance and Use of Technology (UTAUT)
Primary focus	Individual cognitive evaluation of technology	Broader socio-technical and organisational context
Core constructs	Perceived usefulness; perceived ease of use	Performance expectancy; effort expectancy; social influence; facilitating conditions
Level of analysis	Individual clinician	Individual clinician within an organisational environment
Relevance to digital impression technologies	Explains early adoption, user satisfaction, and intention to use digital impressions	Explains sustained use, institutional adoption, and context-dependent barriers
Strengths	Conceptual simplicity; strong predictive validity for initial adoption	Comprehensive explanatory power in complex clinical settings
Limitations	Limited consideration of social and organisational influences	Greater complexity; requires a larger set of variables
Applicability to AI-supported systems	Useful for assessing clinician trust and perceived benefits of AI tools	Relevant for evaluating system integration, organisational readiness, and long-term implementation

3. Materials and Methods

The present study used a structured questionnaire that explores the empirical data and theoretical considerations presented above. The instrument's items captured key dimensions in facilitating the choice of treatment planning, although it was not initially designed to measure the integration of artificial intelligence.

3.1. Study design

The current study evaluated the frequency of use of conventional versus digital impression techniques and the confidence of dentists in the use of modern technologies. The study was approved by the Ethics Committee of the University of Medicine and Pharmacy of Craiova, Romania (approval reference no. 65/ 29.01.2024), in accordance with the ethical guidelines for research with human participants of the University of Medicine and Pharmacy of Craiova, Romania. Informed consent was obtained from all participants by voluntarily accessing the link provided in the online questionnaire.

(a)

(b)

Figure 4. (a) Digital impression technique (b) Conventional impression technique.

The data were collected by distributing an online questionnaire to dentists practicing in the Oltenia region of Romania. The questionnaire included both single-answer questions and multiple-choice questions. Participant selection was designed to reflect demographic and professional characteristics, thereby enabling a rigorous comparative analysis. Respondents were aged 18-65 years and practiced dentistry in urban, rural, or both areas.

Participation in the study was voluntary, and anonymity and data confidentiality were guaranteed.

The questionnaire included the following questions and response options:

1. What is your age? (18-23/ 24-35/ 36-45/ 46-55)
2. In which environment do you practice dentistry? (Rural/ Urban/ Both)
3. What is your professional degree? (Dentist/ Resident dentist/ Specialist dentist / Primary dentist)
4. Which impression technique do you use most frequently? (Conventional impression/ Digital impression / Both methods)
5. What advantages do you think digital impression techniques offer compared to conventional impression techniques? (Efficient communication and increased patient comfort/ Higher accuracy/ Shorter working time/ Reduced risk of impression distortion/ More efficient communication with the dental laboratory)
6. What are the disadvantages of digital impression techniques? (High initial equipment costs/ Need for a learning curve/ Technical problems (software compatibility)/ Limited accessibility in some dental offices/ None)
7. What advantages do you consider that conventional impression techniques offer compared to digital impression techniques? (Lower initial costs/ Accessibility in any dental office/ Possibility to use preferred materials/ Familiarity with traditional techniques/ None)
8. In which situations do you prefer conventional impression techniques over digital impression techniques? (Complex prosthetic cases/ Situations in which digital impression techniques are not available/ Patients unfamiliar with digital technology/ Limited clinical space / Never)
9. Have you experienced significant difficulties when using impression techniques? (Yes/ No/ if yes, specify the challenges)
10. Do you think digital impression techniques will completely replace conventional impression techniques in the future? (Yes/ No/ Not sure)
11. In your opinion, which method provides more accurate clinical results? (Conventional impression techniques/ Digital impression techniques/ Both approaches are equally accurate/ Depends on the clinical case)
12. Would you recommend digital impression techniques to other colleagues? (Yes/ No / if yes, please specify why/ if not, please specify why)
13. What impact do you think digital impression techniques have on patient comfort and satisfaction? (Increase patient comfort and satisfaction/ Decrease patient comfort and satisfaction/ Has no significant impact/ I don't know)
14. Which digital technologies are you currently using in your practice? (Intraoral scanner/ computer-aided design (CAD) software/ 3D printer/ I do not use digital technologies/ All of the above)
15. To what extent are you satisfied with the results obtained using digital impression techniques? (Very satisfied/ Satisfied/ Dissatisfied/ Very dissatisfied)
16. Do you think that specialised training is necessary for the effective use of digital impression techniques? (Yes/ No)

3.2. Statistical Analysis

The data obtained from this questionnaire were collected and organised using Google Forms, and the statistical analysis was performed using Microsoft Excel 365, version 2503 (San Francisco, CA, USA) and SPSS (Statistical Package for the Social Sciences) version 20 (SPSS Inc., Armonk, NY, USA), platforms that allowed the application of relevant statistical tests and the generation of detailed graphical representations for an optimal interpretation of the results. Appropriate statistical methods were used for data analysis, such as the Chi-square test, which was applied to examine the relationships between categorical variables, including the association between professional specialisation and the predominantly used impression technique, the choice of this test was motivated by the need to identify significant associations between these variables. To establish the relevance of the results, a significance threshold of $p < 0.05$ was used, in accordance with biomedical standards. Even though the questionnaire was not initially created to assess the adoption of artificial intelligence, several items cover aspects pertinent to the acceptance of technology and treatment planning in digital clinical contexts.

4. Results

The questionnaire was distributed to a representative sample of dentists in the Oltenia region of Romania, and the results provide a detailed perspective on the degree of implementation and acceptance of digital impressions in daily practice.

Statistical correlations were performed between variables derived from the 16 items of the questionnaire, including the subcomponents of the multiple-choice questions (Table 2).

Table 2. Statistical correlations

	Q1	Q2	Q3	Q4	Q5_1	Q5_2	Q5_3	Q5_4	Q5_5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16
Q1	1	0.017	0.090	0.007	0.072	0.696	0.010	0.015	< 0.0	0.029	0.133	0.050	0.074	0.033	0.123	< 0.0	0.038	0.142	0.033	0.686
Q2		1	0.004	0.005	0.016	0.030	0.100	0.524	0.150	0.242	1.136	0.031	0.949	0.349	0.151	< 0.0	0.094	0.091	0.452	0.478
Q3			1	0.060	0.381	0.074	0.675	0.064	0.021	0.371	0.957	0.274	0.629	0.496	0.819	0.003	0.195	0.756	0.852	0.741
Q4				1	0.285	0.004	0.110	0.625	0.438	0.160	0.422	0.897	0.188	0.299	< 0.0	0.113	0.087	0.633	0.375	0.496
Q5_1					1	0.567	0.161	0.313	0.023	0.269	0.986	0.913	0.212	0.738	0.879	0.415	0.306	0.058	0.413	0.759
Q5_2						1	0.480	0.629	0.437	0.225	0.013	0.228	0.719	0.368	0.047	0.118	0.801	0.254	0.091	0.642
Q5_3							1	< 0.0	0.016	0.837	0.709	0.830	0.199	0.189	0.395	0.401	0.463	0.912	0.581	1
Q5_4								1	< 0.0	0.133	0.361	0.188	0.110	0.027	0.268	0.705	0.598	0.770	0.650	0.178
Q5_5									1	0.649	0.244	0.378	0.012	0.136	0.018	0.184	0.404	0.105	0.672	0.457
Q6										1	0.056	0.376	0.117	0.164	0.076	< 0.0	0.219	0.552	0.162	0.226
Q7											1	0.007	0.234	0.022	0.898	0.348	0.102	0.196	0.310	0.843
Q8												1	0.127	0.964	0.016	0.771	0.360	0.672	0.226	0.049
Q9													1	0.058	0.257	0.371	0.186	0.445	0.325	0.069
Q10														1	0.008	0.069	0.319	0.307	0.027	0.065
Q11															1	0.227	0.646	0.393	0.116	0.067
Q12																1	0.071	0.042	0.264	0.443
Q13																	1	0.073	0.004	0.974
Q14																		1	0.412	0.360
Q15																			1	0.085
Q16																				1

A significant proportion of respondents were between 24 and 35 years old (56.86%) and, alongside a similar age group represented by participants with ages between 36 and 45 years old (18.63%) composed three quarters of the entire study lot (see Table 3).

Most respondents practiced dentistry in urban areas (70.3%), whereas 16.8% practiced in rural areas; the remaining participants practiced in both settings (Table 3).

Digital impression techniques were preferred by 52.5% of respondents, while conventional impression techniques were used by 23.8%. In addition, 27% of respondents reported using both methods. The statistical correlation between Question 1 and Question 4 showed distinct preferences across age groups. Conventional impression techniques were mainly preferred in the 24-35 age group (76.19%).

Table 3. Demographic data.

Parameter		Age group			Total	p
		24-35 Years	36-45 Years	46-65 Years		
Area of practice	Rural	46 (63.89%)	9 (12.5%)	17 (23.61%)	72 (70.59%)	0.017
		79.31%	*47.37%*	*68%*		
	Urban	5 (29.41%)	8 (47.06%)	4 (23.53%)	17 (16.67%)	
		8.62%	*42.11%*	*16%*		
	Both	7 (53.85%)	2 (15.38%)	4 (30.77%)	13 (12.75%)	
		12.07%	10.53%	16%		
	Total	58 (56.86%)	19 (18.63%)	25 (24.51%)	102 (100%)	

Digital impression techniques were predominantly preferred by dentists aged 36-45 years (84.21%). Dentists aged 46-65 years most frequently reported using digital impression techniques (52%). Statistical analysis indicated that the preferences for impression techniques differ significantly between age groups (p = 0.007), confirming a more pronounced tendency among early- to mid-career dentists to adopt digital technology (Table 4).

Table 4. Impression technique used according to the age group

Parameter		Age group			Total	p
		24-35 Years	36-45 Years	46-65 Years		
Impression Technique	Conventional	16 (76.19%)	2 (9.52%)	3 (14.29%)	21 (100%)	0.007
		27.59%	10.53%	12%		
	Digital	22 (43.14%)	16 (31.37%)	13 (25.49%)	51 (100%)	
		37.93%	84.21%	52%		
	Both methods	20 (66.67%)	1 (3.33%)	9 (30%)	30 (100%)	
		34.48%	5.26%	36%		

There was also a statistically significant difference (p = 0.005) between urban and rural areas in the use of digital impression techniques (Table 5).

Table 5. Impression technique used according to the practice area

Parameter		Practice area			Total	p
		Urban	Rural	Both		
Impression Technique	Conventional	14 (66.67%)	1 (4.76%)	6 (28.57%)	21 (100%)	0.005
		19.44%	5.88%	46.15%		
	Digital	35 (68.63%)	14 (27.45%)	2 (3.92%)	51 (100%)	
		48.61%	82.35%	15.38%		
	Both methods	23 (76.67%)	2 (6.67%)	5 (16.67%)	30 (100%)	
		31.94%	11.76%	38.46%		
	Total	72 (100%)	17 (100%)	13 (100%)		

About digital impressions, the advantages listed by respondents included: greater accuracy (56.4%), efficient communication and increased patient comfort (48.5%), reduced working time (33.7%), more efficient communication with the dental laboratory (31.7%), and finally, reduced risk of re-impressing (27.7%) (Figure 5). The disadvantages listed by respondents were primarily related to the high cost of the equipment (47.5%), followed by limited accessibility in some practices (22.8%), technical problems (21.8%), and the need for a learning curve (6.9%) (Figure 6).

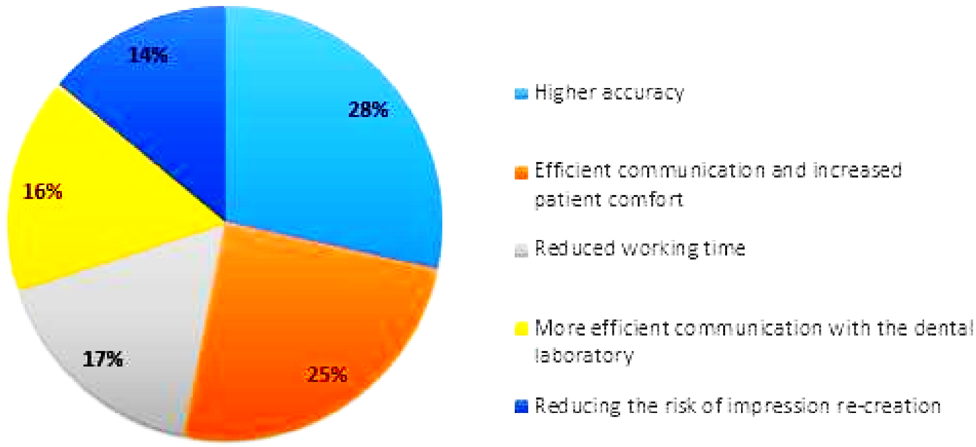

Figure 5. Advantages of the digital impression method

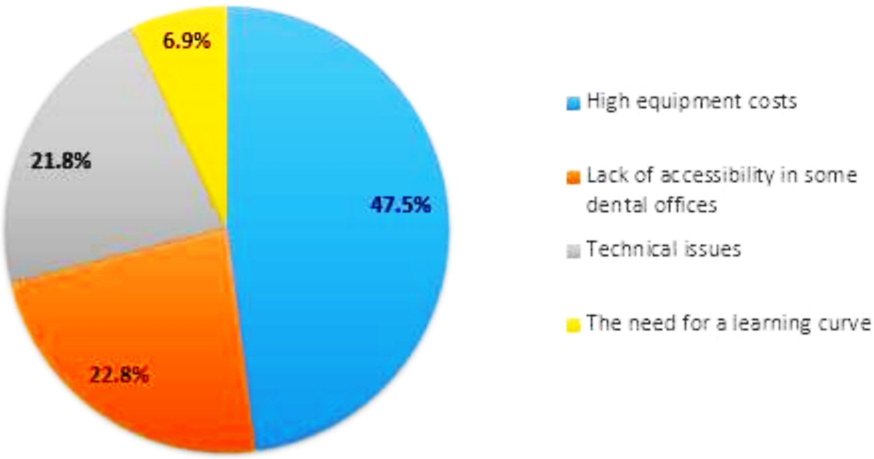

Figure 6. Disadvantages of the digital impression method

Regarding conventional impressions, respondents reported the following advantages: availability in any dental office (40.6%), lower initial costs (28.7%), the option to use preferred materials (16.8%), and familiarity with traditional techniques (12.9%) (Figure 7).

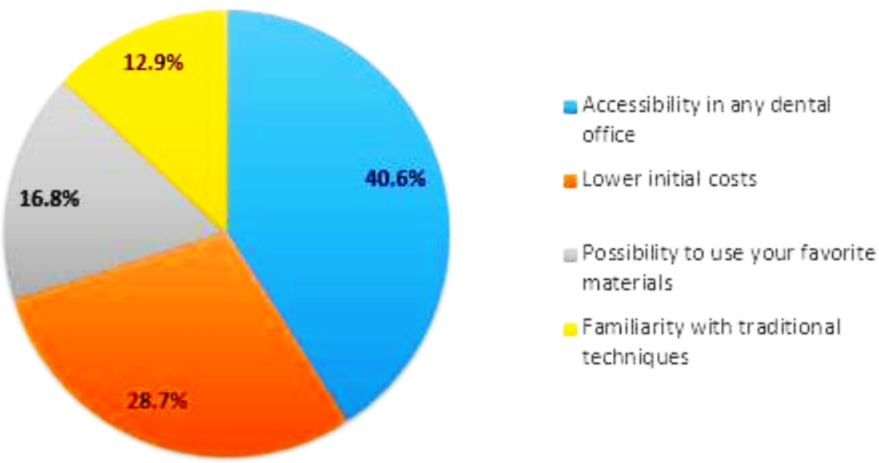

Figure 7. Advantages of the conventional impression method

Conventional impressions are primarily used when digital methods are unavailable (43.6%), in complex prosthetic cases (30.7%), and in situations where patients are unfamiliar with digital technology (23.8%). These responses reflect a pragmatic approach by dentists, who choose the optimal method depending on the circumstances (Figure 8).

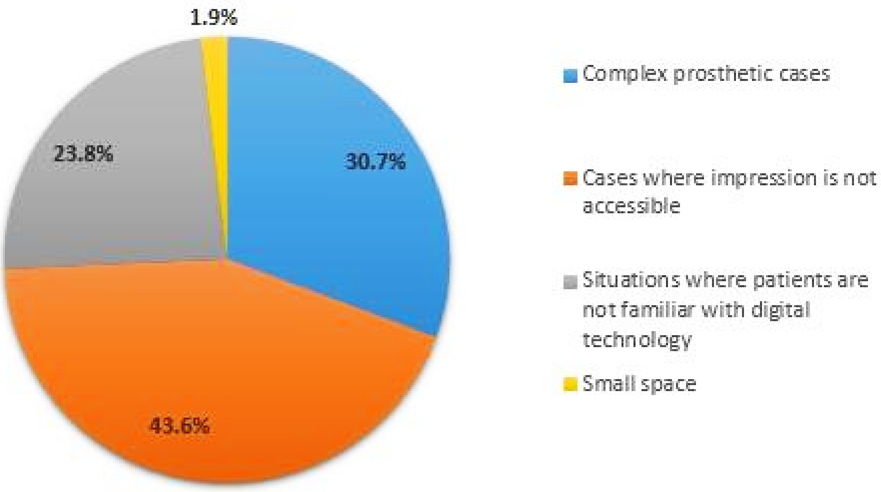

Figure 8. Cases in which the conventional impression method is chosen

On the other hand, most respondents (74.3%) reported no significant difficulties with impression techniques, whereas 20.8% reported problems. This relatively small percentage indicates that the technology is generally well accepted and used without significant complications. 59.4% of respondents believe that digital impression provides more accurate results; 75.2% believe that digital impression techniques improve patient comfort and satisfaction; 61.4% are very satisfied with the results obtained with digital impression techniques; and 36.6% are satisfied. This result confirms the effectiveness of the digital method and its high level of acceptance in practice.

Regarding the accuracy and precision of the two impression techniques, based on respondents' perceptions, digital impression techniques were more frequently correlated with accurate clinical outcomes (67.65%).

65% of responding physicians reported that conventional impression techniques yielded accurate clinical results. The degree of satisfaction among dentists with digital impression techniques is favourable, with 63% satisfied and 37% dissatisfied (Table 6).

Table 6. Impression method with accurate clinical results

Parameter		**Responses**				**p**
		Yes	**No**	**Not sure**		
Impression method	**Conventional impression**	12 (66.67%)	4 (22.22%)	2 (11.11%)	18 (100%)	0.008
		17.65%	23.53%	11.76%		
	Digital impression	46 (75.41%)	8 (13.11%)	7 (11.48%)	61 (100%)	
		67.65%	47.06%	41.18%		
	Both methods	6 (60%)	3 (30%)	1 (10%)	10 (100%)	
		8.82%	17.65%	5.88%		
	Depending on the case	4 (30.77%)	2 (15.38%)	7 (53.85%)	13 (100%)	
		5.88%	11.76%	41.18%		
		68 (100%)	17 (100%)	17 (100%)		

Regarding dentists' satisfaction with the use of the digital impression technique, the correlation analysis indicates that most respondents among those who are very satisfied (72.06%) believe that the digital impression technique has the potential to replace the conventional impression technique entirely.

At the same time, only satisfied dentists show a lower percentage (26.47%) in this direction, whereas dissatisfied dentists constitute a very small proportion. These data clearly show that satisfaction levels influence dentists' confidence in the widespread adoption of digital technology (Table 7).

Table 7. Degree of satisfaction among physicians based on the impression method

Parameter		**Responses**				**P**
		Yes	**No**	**Not sure**		
Degree of satisfaction	**Very satisfied**	49 (77.78%)	6 (9.52%)	8 (12.7%)	63 (100%)	0.027
		72.06%	35.29%	47.06%		
	Satisfied	18 (48.65%)	10 (27.03%)	9 (24.32%)	37 (100%)	
		26.47%	58.82%	52.94%		
	Dissatisfied	1 (50%)	1 (50%)	0 (0%)	2 (100%)	
		1.47%	5.88%	0%		
		68 (100%)	17 (100%)	17 (100%)		

Regarding the association between the perceived impact of digital impression techniques on patient comfort and dentists' satisfaction, the data show a strong correlation between these variables. Among dentists who believe that digital impression techniques increase patient comfort and satisfaction (71.43%), a similar proportion (71.43%) also reports being very satisfied with the results obtained using this technique. In contrast, among those who believe the impact of digitization is not significant, only 44.44% report being very satisfied, and dentists who believe that the digital impression technique reduces patient comfort report an average level of satisfaction (100%). These results indicate that a positive perception of the patient experience directly influences dentists' satisfaction with digital technology, confirming the correspondence between patients' clinical benefits and dentists' professional assessments (Table 8).

Table 8. The degree of satisfaction of doctors in terms of patient comfort and satisfaction.

Parameter		**Responses**					**P**
		Increase patient comfort and satisfaction	**Decrease patient comfort and satisfaction**	**Has no significant impact**	**I don't know**		
Degree of satisfaction	**Very satisfied**	55 (87.3%)	0 (0%)	8 (12.7%)	0 (0%)	63 (100%)	0.004
		71.43%	0%	44.44%	0%		
	Satisfied	20 (54.05%)	3 (8.11%)	10 (27.03%)	4 (10.81%)	37 (100%)	
		25.97%	100%	55.56%	100%		
	Dissatisfied	2 (100%)	0 (0%)	0 (0%)	0 (0%)	2 (100%)	
		2.6%	0%	0%	0%		
		77 (100%)	3 (100%)	18 (100%)	4 (100%)	102 (100%)	

Regarding the relationship between the use of digital technologies in dental practice and the recommendation of digital impressions, the results show a clear trend: dentists who frequently use digital technologies are also those who most often recommend this method to their colleagues. Among intraoral scanner users, 70.79% would recommend digital impressions, whereas the percentages are lower among those who use 3D printers (10.11%) or CAD software (19.1%).

These data show that direct and consistent experience with digital technology, particularly the intraoral scanner, is associated with greater confidence in this method and a stronger inclination to promote it to other professionals. Thus, the extent of integration of digital technologies into daily practice significantly influences dentists' willingness to recommend this technique (Table 9).

Table 9. The correlation between the use of digital technologies in dental practice and the recommendation of digital impressions

Parameters		Responses			P
		Da	Nu		
Digital technologies	3D printers	9 (69.23%)	4 (30.77%)	13 (100%)	0.042
		10.11%	30.77%		
	Intraoral scanner	63 (92.65%)	5 (7.35%)	68 (100%)	
		70.79%	38.46%		
	CAD software	17 (80.95%)	4 (19.05%)	21 (100%)	
		19.1%	30.77%		
		89 (100%)	13 (100%)	102 (100%)	

5. Discussion

The analysis of the questionnaire responses indicates an increasing adoption of digital impression techniques in dental practice. The largest proportion of respondents belonged to the 36–45 age group (24.8%), followed by those aged 24–35 (18.8%). Most participants reported practicing in urban settings (70.3% exclusively in urban areas, with an additional 12.75% practicing both in urban and rural environments). While this distribution may reflect greater access to professional networks and training opportunities typically associated with urban environments, the study findings revealed a higher adoption rate of digital techniques among practitioners working in rural settings compared with those practicing in urban areas. This result suggests that factors other than geographical location—such as individual motivation, practice organization, or perceived clinical benefits—may influence the implementation of digital technologies in dental practice. Previous studies have also highlighted the role of structural and organizational factors, including access to training, peer networks, and technical assistance, in supporting the sustained use of healthcare technologies (Venkatesh, Sykes, & Zhang, 2016; Liberati et al., 2022).

Professional status indicates a strong interest in digital technologies, with 49.5% of participants being dentists and 34.7% being residents. Digital impressions were the most commonly used method (52.5%), while 23.8% relied exclusively on conventional impressions and 27% reported a combination of both techniques, reflecting a pragmatic, hybrid approach to clinical practice. The above results are consistent with previous research showing that digital impression techniques are perceived as easier to perform by less experienced clinicians, while more experienced practitioners tend to distribute their preferences more evenly between techniques (Lee et al., 2022; Papaspyridakos et al., 2020; Róth et al., 2020; Ciocan et al., 2025). Several advantages of digital impression techniques were identified by respondents, notably higher accuracy (56.4%), improved communication and patient comfort (48.5%), reduced working time (33.7%) and lower risk of re-impression (27.7%). Improved communication with dental laboratories was also highlighted by 31.7% of participants, supporting improved prosthetic outcomes. The main limitation to adoption was the high initial cost of the equipment (47.5%), followed by limited access to digital technology in some practices (22.8%) and technical challenges such as software incompatibilities (21.8%), which can particularly constrain implementation in smaller or resource-poor environments. Conventional methods remain in use due to their affordability (40.6%), lower initial costs (28.7%), and ability to use preferred materials (16.8%), particularly in practices lacking advanced digital infrastructure. Digital impressions were perceived as more accurate by 59.4% of respondents, and a substantial majority would recommend their use to fellow practitioners (78.2%), indicating high confidence in the technology. Additionally, 75.2% of participants reported improved patient comfort and satisfaction, while overall professional satisfaction was high, with 61.4% stating they were very satisfied and 36.6% satisfied with digital impression results. The technological efficiency, and increased confidence in optimal therapeutic conduct, coupled with high levels of satisfaction, associated with digital imaging workflows appear to reflect not only continuous visual feedback but also real-time validation of image quality, which reduces procedural uncertainty, consistent with evidence linking clinician confidence and perceived system reliability to improved decision-making in technology-assisted environments (Shortliffe & Sepúlveda, 2018; Kelly et al., 2019). The results align with previous studies reporting superior time efficiency, reduced error rates, improved patient comfort, and simplified data management with digital imaging compared to conventional techniques (Yuzbasioglu et al., 2014; Yilmaz et al., 2021; Ahmed et al., 2024; Bernburg et al., 2025; Ahlholm et al., 2018; Lee et al., 2022; Papaspyridakos et al., 2016; Bi et al., 2022; Dauti et al., 2016; Tabesh et al., 2021). However, traditional impressions remain preferable when digital options are not available (43.6%), in complex prosthetic cases (30.7%), or when patients are unfamiliar with digital technologies (23.8%), highlighting the continued relevance of a hybrid approach in contemporary dental practice.

A large proportion of respondents (74.3%) reported no significant difficulties with using digital impressions, indicating a high level of adaptability to this technology. However, 20.8% reported difficulties, suggesting that more training or improvements in the equipment and software used are needed. The correlation between practical experience with digital impression systems and an increased willingness to adopt and support these technologies underscores the importance of trust built through consistent use. Trust in digital clinical systems tends to develop over time, as clinicians become familiar with the behavior, constraints, and reliability of the system in various situations. Trust is influenced not only by initial expectations, but also by experiential learning and the congruence between system performance and clinical judgment (Sauer, Sonderegger, & Schmutz, 2020; Beede et al., 2020). In dental practice, frequent use of intraoral scanners can increase clinicians' confidence in digital workflows, facilitating the transition from tentative use to regular incorporation into clinical decision-making processes.

Regarding the possibility of digital impression techniques permanently replacing the traditional method, only 6.3% of respondents believe this will occur, whereas 16.8% believe the conventional method will continue to be used. These results indicate that, although digital technology is becoming increasingly popular, the conventional method will not disappear completely.

Only 16.3% of respondents believe specialised training is required to use digital impression techniques, suggesting that most dentists adapt to this technology relatively easily. However, perception may vary with each user's experience and the complexity of the system used.

This study presents limitations for interpreting the results: it was conducted exclusively in the Oltenia region, which may limit the generalisability of the findings at the national level. A larger and more diverse sample would have allowed a broader analysis of how digitization is being adopted in different regions of the country; since the data were collected through a self-administered questionnaire, there is a risk of self-reporting biases, such as subjectivity of responses, overestimation of digital skills or a tendency to provide socially acceptable answers; given that the majority of participants practice in the urban environment, the results may overestimate the acceptance and use of digital technologies, since urban cabinets generally have easier access to modern; the study is based strictly on the perception of doctors and does not include objective assessments of the accuracy of the two types of impression techniques, not analyzing concrete clinical results, such as marginal adaptation or recovery rate of prosthetic works; respondents use different models of intraoral scanners and CAD software, which can generate significant variations in reported experiences (the study does not differentiate results according to brands or technological generations); although high costs were cited as a disadvantage, a detailed cost-benefit analysis comparing the two techniques from a financial and profitability perspective was not carried out.

Based on the identified results and limitations, the following future research directions can be proposed: expanding the research in several regions of Romania or in other countries would allow a broader understanding of the level of digitization and the factors influencing the adoption of digital impression technologies; it is necessary to assess under controlled conditions the accuracy of impression, the adaptation of restorations and the long-term success rate in order to validate the perceptions reported by dentists; investigate how dentists' attitude and competencies towards digital technologies evolve over time, with the accumulation of experience and the acceleration of digitization; future studies should compare initial costs, maintenance costs, cost-effectiveness and the financial impact; since the current study is based only on the perspective of dentists, future research could examine the satisfaction, convenience and acceptance of digital technologies from the perspective of patients; evaluating the performance of existing models on the market would provide helpful information on optimal investments and support the standardization of the use of impression techniques; a study focused on the efficiency of full digital flow, from intraoral scanning to prosthetic production in the laboratory, would clarify how new technologies optimize communication and reduce laboratory errors.

6. Conclusions

Therefore, the results of the questionnaire indicate a clear aspiration towards digitalisation in dental impression techniques, with the majority of respondents stating that they appreciate the accuracy, efficiency and increased patient comfort offered by digital methods. Unfortunately, a number of limitations stand in the way of the full adoption of this technology, such as the high costs of the equipment and accessibility issues in some dental offices. Digital impression techniques are considered superior in terms of accuracy and patient satisfaction, but nevertheless, conventional impression techniques are still used in certain situations due to their accessibility and low cost. In this context, it can be concluded that the two methods will continue to coexist, at least in the medium term, depending on the available resources and the needs of each dental office.

Immediate feedback and improved information transfer throughout the clinical process are provided by digital impression workflows that can also support appropriate, informed, and safer clinical conduct.

Over time, digital dentistry will most likely continue to advance, and these technologies are increasingly positioned as fundamental elements of future artificial intelligence-assisted dental workflows, having particular relevance for optimal workflow, quality of care, and technology-mediated clinical practice.

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Data Availability Statement: The authors declare that the data of this research are available from the corresponding authors upon reasonable request. The data are not publicly available due to privacy.

Conflicts of Interest: The authors declare no conflict of interest.

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