Journal of Economic Integration | Vol: 13 - N°: 04 / (December 2025) | pp: 135-146

Measuring The Ability of Auditors To Keep Pace With Digital Technologies In Audit Operations Using The Rasch Model

قياس قدرة محافظي الحسابات على مواكبة التقنيات الرقمية في عمليات المراجعة، باستخدام نموذج راش

Souad Bechoua [1], Samiha Bouhafs [2]

[1] Abbes Laghrour University- Khenchela (Algeria), bechoua.souad@univ-khenchela.dz
[2] Abbes Laghrour University- Khenchela (Algeria), bouhafs.samiha@univ-khenchela.dz

Received: 26/10/2025 **Accepted:** 12/12/2025 **Published:** 31/12/2025

Abstract:

This study aims to evaluate the abilities of auditors in keeping pace with digital technologies and procedures related to the audit process in the digital environment as a supportive tool for professional performance and enhancing the quality and credibility of the resulting outcomes. The study relied on the Rasch model for data analysis using the WINISTEP program to verify the quality of items included in the questionnaire questions designated for the dimensions of digital technologies in the audit process to measure their latent ability. The study reached a set of results, the most important of which is the existence of a statistically significant relationship between the questionnaire items and the ability of auditors, where the questionnaire items, except for one item, belong to the Rasch model, which proves the suitability of the questionnaire for data analysis according to the Rasch model. While the study of item difficulty values shows the existence of an acceptable to high level of use and mastery of digital technologies among auditors, which proves that they possess varying abilities in light of the existence of variance related to professional factors.

Keywords: Auditor; Digital Technologies; Audit Process; Digital Environment; Rasch Model.
JEL Classification Codes: M42, O33, Q56

ملخص:

تهدف الدراسة لتقييم قدرات محافظي الحسابات في مواكبتهم للتقنيات الرقمية والاجراءات المتعلقة بعملية المراجعة في البيئة الرقمية كاداة داعمة للأداء المهني وتعزيز جودة ومصداقية النتائج المترتبة عليها ، وتم الاعتماد على نموذج *Rasch* لتحليل البيانات باستخدام برنامج *WINISTEP* ،للتحقق من جودة الفقرات المتضمنة في أسئلة الاستبيان المحدد لأبعاد التقنيات الرقمية لعملية المراجعة لقياس القدرة الكامنة لها،وتوصلت الدراسة لجملة من النتائج أهمها وجود علاقة دالة احصائيا بين فقرات الاستبيان وقدرة محافظي الحسابات، أين كانت فقرات الاستبيان باستثناء فقرة واحدة تنتمي الى نموذج راش ما يثبت ملائمة الاستبيان لتحليل البيانات وفقا لنموذج راش،في حين يظهر دراسة قيم صعوبة الفقرات وجود مستوى مقبول الى عالي من استخدام واتقان التقنيات الرقمية لدى محافظي الحسابات، ما يثبت أنهم يمتلكون قدرات متفاوتة في ظل وجود تباين مرتبط بعوامل مهنية.

كلمات مفتاحية: محافظ الحسابات، التقنيات الرقمية، عملية المراجعة، البيئة الرقمية، نموذج راش.

تصنيفات JEL : M42، O33، Q56

Corresponding author: Souad Bechoua, **e-mail:** bechoua.souad@univ-khenchela.dz

INTRODUCTION:

Working to keep pace with continuous changes in the field of digital transformation and integrating them into the audit process is an urgent necessity to increase efficiency and effectiveness in the results disclosed by auditors, in light of the increasing reliance on digital outputs of accounting systems, which requires auditors to possess digital capabilities that reflect their skills in using digital technologies and analyzing the results extracted from them as reliable audit evidence that helps enhance the transparency and credibility of data issued in reports and financial statements and their appropriateness for users of financial information.

The audit process that uses auditing standards and digital technologies contributes to understanding how data is stored in cloud computing and analyzed, using blockchain technology to know the extent of its impact on accounting systems and records and analyzing transactions resulting from smart contracts, benefiting from intelligent algorithms to detect any errors or violations using artificial intelligence tools, and understanding digital threats and knowing how they affect financial data using cybersecurity, to achieve the required speed, accuracy, and flexibility in the audit process, which is reflected in the quality of the audit and the efficiency of auditors and their position in the field of the profession.

To measure the importance of auditors keeping pace with digital technologies, the Rasch model was used according to the Winsteps program, as it helps measure the objectivity of study variables and their correlation with each other to enhance understanding, and for its contribution to improving data quality, to make its results used as a base for professional bodies in designing appropriate training programs that are compatible with the digital business environment. The study focuses on describing the characteristics of auditors to determine their ability to master digital technologies quantitatively.

Problem Statement

The study sought to prepare and develop a quantitative tool with a high degree of reliability to measure the targeted dimension objectively in light of the low availability of tools through which auditors' skills can be assessed in keeping pace with the use of digital technologies and their impact on the quality of the audit process and improving professional performance, using the unidimensional Rasch model. Hence, we pose the following question:

To what extent are the items for measuring the use of digital technologies in the audit process suitable when analyzing auditors' responses using the Rasch model?

To comprehensively address the study topic, we pose the following sub-questions:

- What is the difficulty of the items in the scale of auditors' keeping pace with the use of digital technologies in the audit process according to the Rasch model?
- Do auditors' responses achieve the unidimensionality assumption of the Rasch model?
- Is there a statistically significant variance between the use of digital technologies in the audit process and the levels of auditors' keeping pace with them?
- To what extent do the items in the scale of auditors' keeping pace with the use of digital technologies in the audit process conform according to the Rasch model?

Importance and Objectives of the Study

The importance of the study is evident through its contribution to measuring the digital capabilities of auditors objectively, clarifying the dimensions of the digital environment and its

impact on the audit process, using the Rasch model for the results it provides that allow standing on the modern requirements of the auditing profession. The study aims to:

1. Build and develop a quantitative measurement tool to measure the digital capability of auditors in the field of auditing to enhance the reliability and appropriateness of information for decision-makers, through studying the characteristics of questionnaire items and linking them to the responses of study participants to provide added value objectively.

2. Use the Rasch model for data analysis that allows measuring item difficulty and their conformity to the model, and estimating the abilities of sample members.

3. Rely on the adopted research results to measure the level of auditors' use of digital technologies to identify the strengths and weaknesses suffered by audit profession practitioners in the digital environment.

4. Include a training program based on gradual use of technologies and their application to ensure meeting the needs of various institutions in the digital environment.

LITERATURE REVIEW

(Arzhenovskiy , Bakhteev, Sinyavskaya, & Hahonova, 2019) Examined to develop an audit risk model based on analyzing the classical ARM audit model with the addition of elements to assess risks related to various aspects of the task. It included an analysis of the development of the classical ARM model as the basis for the study model, in addition to current research in audit risk modeling review, by describing the necessary requirements for the required ARM characteristics based on the analysis of study data. The research paper also presents the ARM modification through analyzing the classical conceptual model to the level of simple binary statements, as well as presenting the main structural elements of the developed model. And the study of (Hidayat, Fitri, & Bakri, 2020) aimed to analyze the dimensions of emotional intelligence as they are necessary in duty performance based on a quantitative approach that included 105 professional auditors. The study instrument consisted of 25 items developed from Goleman's theory of emotional intelligence, and the analysis is based on the Rasch model. The study found that the five dimensions of self-awareness, self-management, motivation, social awareness, empathy, and relationship management are factors that the auditor must possess.

(Kokina, Gilleran, Blanchette, & Stoddard, 2019) Examined to discover how Robotic Process Automation (RPA) changes the work of accountants, while identifying the roles that accountants play in the digital transformations of their organizations. Using a case study methodology to collect data through interviews with eight organizations subject to robotic process automation applications for their accounting and financial tasks, the study found that accountants have an important role as identifiers, interpreters, trainers, supporters, and analysts of automation initiatives in their organizations. To perform these roles, accountants must acquire new technical skills to map the necessary skills that the accountant is expected to perform in process automation applications. And the study of (Kotivirta, 2025) aimed to bridge a research gap by identifying the benefits and challenges of artificial intelligence automation and expanding its scope for international audit firms, by discovering how artificial intelligence automation affects the role of auditors. Data was collected through semi-structured interviews centered on automation, adaptation between auditors and artificial intelligence, and the jointly managed audit model. The sample consisted of executive officials, and the study reached a set

of results including that artificial intelligence supports and enhances auditors' capabilities, creating audit teams of auditors and machines, leading to the necessity of acquiring new skills to ensure success in an environment that depends on artificial intelligence. Artificial intelligence also provides many benefits for the audit firm (increased efficiency, improved quality, risk detection), and also poses a set of challenges (lack of trust and transparency, regulatory uncertainty, over-reliance, and data standardization more broadly related).

Through the review of previous studies, we find that the studies aimed to discover the impact of automation and artificial intelligence on the role of accountants and auditors by relying on studying how, based on conducting interviews with officials of institutions and international audit firms on one hand. The studies also relied on developing an audit risk model and analyzing the dimensions of emotional intelligence among auditors using the Rasch model. The current study differs from previous studies in that it is among the first studies that used the Rasch model to measure the ability of auditors to keep pace with digital technologies in their various dimensions in the audit process by building items that clearly reflect these technologies combined in one test, although the Rasch model is not commonly used in the accounting field, it is an objective measurement model that can be used to convert qualitative data into quantitative measures that can be analyzed and concluded

1- Theoretical Literature:

An auditor is a person independent of the company's body who provides a neutral technical opinion on the company's situation after reviewing its financial data and ensuring its transparency for the purpose of presenting it to its users. However, this opinion cannot enjoy credibility except when using renewable and advanced digital technologies in conjunction with digital transformation changes, some of which we mention in the following points:

- **Cloud Computing:** It is a method of accessing shared groups of configurable hardware and software resources such as computer networks, data storage, and applications that can be easily provided with minimal effort. The cloud computing model provides using one of three service models: Infrastructure as a Service (IAAS), Platform as a Service (PAAS), and Software as a Service (SAAS).
- **Blockchain:** It is a distributed digital ledger that records transactions instantly. These transactions are not limited to monetary transactions but are virtually applied across various fields and sectors.
- **Cybersecurity:** It is a set of technologies and procedures designed to protect computers, networks, programs, and data. It has witnessed tremendous technological changes, and its operations in the field of computing and data science drive this change. (khalfallah & bendjelloul, 2023)
- **Artificial Intelligence:** Audit tasks are compatible with technological applications supported by artificial intelligence through using neural networks in analysis and review procedures, using genetic algorithms to assist in classification tasks, as well as using expert systems in assessing relative importance and evaluating internal control. Therefore, the impact of artificial intelligence in audit operations is particularly evident in the field of obtaining data (identifying information and extracting it from electronic documents and comparing and verifying its accuracy), detecting anomalies in data to draw a comprehensive picture of it, the ability to make predictions of financial events, which makes the auditor allocate

more time to areas that require higher-level judgment. (Kokina & Davenport, The emergence of artificial intelligence: how automation is changing auditing, 2017)

- **Big Data:** Among the modern technologies that make the auditor aspire to professionalism and skeptical review, the use of big data-based audit approach improves the quality of examination procedures, which helps the auditor achieve the best results on one hand, and improve his skills in examining digital transactions, data flow speed, data preservation, etc. (Bambang, 2024)

Data analysis incorporates several operations to make the most of data used, which are: بوبعاية) و شهرزاد، 2021)

/.Data Management: Ensuring data validation, security and processing in order to access to reliable and relevant data in due course.

/.Data Mining: analysing data to discover patterns and relationships, such as links and sequences among events

/.Predictive Analytics: Focusing on the prediction of future outcomes based on a collection of inputs, typically through statistical algorithms and machine learning techniques.

/.Text Analytics: Examining textual data obtained from websites, email communications and other textual sources to generate valuable insights with the assistance of machine learning and language technologies.

Although big data carries many advantages, it represents a practical challenge due to the enormous volume of data. Data presents computational problems at present because it does not contain the analytical tools that auditors use to determine their ability to benefit from big data. In this case, the solution may include selecting subsets of data managed by more complex analytical tools, while ensuring the availability, integration, and appropriateness of information. (Pedrosa, 2019)

However, auditors are accused of not possessing or lacking the training, skill, and ability necessary to evaluate and understand big data in companies. Many companies have developed skills that have proven useful in dealing with traditional data but have not done so with big data. (Rosnidah, Johari, Hairudin, Hussin, & Musyaffi, 2022)

We also find that Big Data Analytics (BDA) tools are advanced programming skills that express skills that most auditors do not possess in the current era, and do not usually form part of traditional professional training in accounting. Therefore, auditors often rely on computer programming capabilities from internal company departments as data assurance. (Salijeni, Samsonova-Taddei, & Turley, 2021)

Auditors should be able to use more efficiently to accomplish various audit tasks, by working to improve the efficiency and effectiveness of audit procedures in detecting and preventing fraud through using audit techniques such as using predictive models in auditing to simulate correlations between many important aspects such as business continuity and fraud. Auditors can monitor links between various aspects by extracting transactions and historical data, in addition to external data to assess business continuity risks. (Rosnidah, Johari, Hairudin, Hussin, & Musyaffi, 2022)

2- METHODOLOGY:

The deductive approach was adopted by focusing on the descriptive approach to highlight

the general concepts related to the study topic, by shedding light on the different concepts of digital technologies, and showing the capabilities of auditors in keeping pace with digital technologies in the audit process in a quantitative form using the Rasch model.

24 items were formulated in a way that reflects the dimensions of digital technologies logically through which we can judge the ability of auditors to improve their professional performance, by relying on multiple-choice response type by giving the model two responses to the item: the correct answer is symbolized by the number 1, and the incorrect answer is symbolized by the symbol 0. The Rasch model was used in data analysis to determine the difficulty of the test for the target sample and estimate the probability of sample members answering correctly as a function of their ability, which achieves test objectivity.

Study Population and Sample

An electronic questionnaire and a manual questionnaire were prepared and distributed to auditors in an attempt to cover a large percentage due to their importance in practicing the accounting profession. More than 200 questionnaires were distributed, and after waiting for a relatively long time, 125 questionnaires were retrieved. 5 questionnaires were excluded for not completing the answers to the items, so 120 items were analyzed, which was estimated at 60%.

3- Study Instrument:

The unidimensional Rasch model was used according to the Winsteps VER3.7.3 program to measure the extent of auditors' keeping pace with digital technologies in audit operations, by evaluating the extent of data compatibility with what the model expects through a statistical study of the appropriateness of items and individuals to verify the compatibility of participants' responses with the recommended general measurement, measuring the difficulty of items and their discrimination coefficient, to distinguish between auditors with high and low abilities in using digital technologies circulated in the digital business environment to prove the validity of the audit process in various forms of companies, especially large ones, as well as measuring reliability according to Cronbach's alpha, separation coefficient, and polarity elements that measure data according to PTMEA CORR. To judge the validity of the criteria used in the study, reliance was placed on the ranges recommended in the table below for model appropriateness.

Table 1: representing the most important measurement indicators according to the Rasch model and the statistical threshold

Criterion	Statistical Indicator
Internal Fit INFIT mean square	Must fall within the range 0.6 to 1.4
External Fit OUTFIT mean square	
Z-Standardized INFIT/OUTFIT	Falls within the range from -2 to +2
Point-Measure Correlation PTMEA CORR	PTMEA CORR > 0.30
ITEM Difficulty - Logit - PERSON Ability - Logit -	Logit (-2.0 / +2.0) Logit (-3.0 / +3.0)
Separation	Person S > 2.0
Reliability	Reliability > 0.99 > 0.71
Raw Variance Explained by Measures	RVE by measures > 29.5%
Unexplained Variance in 1st Contrast	V 1st contrast > 2
ITEM Discrimination	1.5 > Discrimination Index > 0.4
LOCAL Independence	LOCAL IND < 0.30 LOCAL IND < 0.5

Source: (Mohd.Yasin, Nur Yunus, Che Rus, Ahmad, & Rahim, 2015), (Chung, Zali, Yan, & Ling Loo,

2023), (Linacre), (Edelen & Reeve, 2007)

- **Measuring Data Appropriateness to the Model**

To verify objectivity in the measurement tool, we conducted a preliminary analysis of the data to observe that the model needs modification by deleting items and sample members whose responses did not achieve the study's objective.

Table 2: the internal and external fit statistics for individuals and items inappropriate for the Rasch Model

Correlation	OUTFIT ZSTD	OUTFIT MINSQ	INFIT ZSTD	INFIT MINSQ	Standard error	Ability	Elements
Person							
-0.14	3.31	9.90	0.50	1.19	0.65	-1.03	Per43
0.01	3.07	5.86	1.59	1.50	0.57	-0.29	Per59
Item							
-0.07	3.13	5.30	0.87	1.30	0.49	-2.06	Item12

Source: WINISTEP program outputs

To ensure the integrity of statistical analysis according to the Rasch model, it is necessary to delete items with anomalous responses, which were identified in the questionnaire as item number 12, which includes "You possess programming skills to work within technical teams to test automation using RPA," which recorded a negative and near-zero correlation rate with a value of -0.07, and recorded a value (MINSQ=5.30, ZSTD=3.13), which is higher than the threshold of 1.4. The responses of auditors identified by numbers 43 and 59 respectively were also deleted for recording low correlation rates, while they recorded (ZSTD > 3), (MINSQ > 5).

To know the extent of homogeneity of questionnaire items and their internal consistency with the model, it is necessary to determine the dimensions of items and their arrangement, and measure their difficulty according to the difficulty coefficient measured in Logit units, and measure the discrimination coefficient using the biserial correlation coefficient, where the questionnaire data consisting of 23 items was analyzed after deleting item number 12.

Table 3: the standard characteristics of model expressions after excluding inappropriate expressions

Paragraph Order	Paragraph Number in Form	Raw Score	Difficulty Measure (LOGIT)	Model Standard Error (S-E)	Paragraph Order	Paragraph Number in Form	Raw Score	Difficulty Measure (LOGIT)	Model Standard Error (S-E)
1	Ite13	22	1.93	0.32	13	Ite5	40	0.14-	0.29
2	Ite11	26	1.32	0.31	14	Ite14	43	0.36-	0.29
3	Ite7	28	1.17	0.30	15	Ite15	45	0.61-	0.29
4	Ite3	28	1.13	0.30	16	Ite22	45	-0.61	0.29
5	Ite8	32	0.74	0.29	17	Ite20	48	0.98-	0.29
6	Ite4	34	0.51	0.29	18	Ite23	48	-0.98	0.29
7	Ite2	34	0.45	0.29	19	Ite19	49	1.05-	0.29
8	Ite21	36	0.35	0.29	20	Ite17	58	1.72-	0.30

9	Ite24	36	0.35	0.29	21	Ite16	64	1.98-	0.30
10	Ite9	36	0.31	0.29	22	Ite6	72	-2.01	0.31
11	Ite10	37	0.22	0.29	23	Ite18	72	-2.01	0.31
12	Ite1	38	0.15	0.29					
2.64									**Separation**
0.87									**Reliability**

Source: WINISTEP program outputs

From the table, we find that Cronbach's alpha recorded a value of 0.87, which confirms that the questionnaire enjoys a high degree of reliability as it falls within the recommended range (0.71-0.99) and reflects the ability of auditors to answer study questions. The standard error value is low, ranging from 0.29 to 0.32, which proves that the estimation of item difficulty is done well. The results indicated that the separation value = 2.64, which is greater than the specified threshold (Separation > 2.0), making the sample sufficient to separate between auditors' abilities and questionnaire items. Therefore, we find that the items range from easy to difficult, according to the following:

The responses of 118 auditors agreed on the ease of items (6, 16, 18) respectively with a value (Logit > 2.0), which included measuring "auditors' skills in using data analysis technology based on computer software to detect illogical operations and analyze accounting operations, and among the systems used in data analysis are EXCEL, ERP, IDEA, ACL," which reflects acceptable practices widely circulated among profession practitioners.

The responses of 58 to 80 auditors relatively agreed on the content of items (1, 5, 14, 15, 19, 20, 21), where the items included measuring "the extent of auditors' familiarity with information technology and how to perform the audit process in the structure and information systems of the institution through their skills and continuous training on the mechanisms of the electronic system within the institution and how the correct input of information and its smooth flow without major errors occurs, and methods of data retrieval and modification (inventory review, purchases, etc.)," making them medium difficulty as they ranged from -1.05 as a minimum to 0.15 as a maximum.

While we find that the following items (3, 7, 11, 13), which included measuring "the level of training and knowledge regarding programming skills, engaging in training programs for digital audit teams and learning computer algorithms to detect fraud, network risks and cyber attacks and their impact on the credibility of the audit process, which relate to cybersecurity and automation," about 42 to 58 auditors agreed on them only, which proves that the items reflect advanced digital technical concepts that auditors face with relative difficulty, making them need greater competence and skill to master them in digital environments.

Table 4: the discrimination coefficient of model expressions after excluding inappropriate expressions

Paragraph Number	Discrimination Index	Paragraph Number	Discrimination Index	Paragraph Number	Discrimination Index
19	0.44	13	0.30	6	0.42

05	0.40	10	0.49	20	0.39
16	0.33	02	051	18	0.45
11	0.45	08	0.55	23	0.46
21	0.46	04	0.41	22	0.40
17	0.42	07	0.55	01	0.51
14	0.35	09	0.56	24	0.48
03	0.48	15	0.61		

Source: WINISTEP program outputs

From the table, we find that the discrimination coefficient, which measures the item's ability to distinguish between people with different abilities, high and low, recorded 0.30 as a minimum and 0.61 as a maximum, which makes it fall within the acceptable range (0.30 to 0.70), indicating the consistency of items and their ability to distinguish between auditors according to their skills in the audit process within the digital environment, where it recorded:

Items with high values (0.61, 0.56, 0.55, 0.49, 0.48, 0.46, 0.45) confirm the existence of a high ability to distinguish between auditors who find difficulty in digital audit techniques and those who enjoy competence in using them, making challenges in the field of digital audit characterized by variance between auditors in the level of digital technologies.

Items with medium values (0.40, 0.41, 0.42) make auditors' responses relatively varied because those with familiarity and practice in the field of digital audit answered with greater confidence, while these digital technologies are less clear to auditors with modest digital skills.

Items with acceptable values (0.30, 0.33, 0.35) make auditors' responses possess an acceptable level of digital skills actually practiced in a simple manner in the field of audit, making their responses relatively close.

- **Verification of the Unidimensionality Assumption for Sample Members' Responses**

The test was applied in its modified form, consisting of 21 items to test the unidimensionality of data, which confirms the objectivity of auditors' responses to questionnaire items.

Table 5: the results of principal component analysis of residuals to verify unidimensionality using the Rasch model for responses of 74 auditors on 20 items for keeping pace with digital technologies in the field of audit

Table of STANDARDIZED RESIDUAL variance in Eigenvalue units	Empirical	Observed %	Expected %
Total raw variance in observations	24.9530	100	100
Raw variance explained by measures - Rasch model estimates	7.9530	31.9	32.1

Raw variance explained by persons	3.9669	15.9	16.0
Raw variance explained by items	3.9861	16.0	16.0
Raw unexplained variance (total)	23	68.1	100
Variance in 1st contrast	2.04	8.2	12.1

Table of STANDARDIZED RESIDUAL variance in Eigenvalue units = ITEM information units*

Source: WINISTEP program outputs

From the table, we find that the variance value explained by RASCH model estimates falls within the recommended range between 20% to 80%, and since it recorded 31.9% in the study, the unidimensionality condition is achieved. One of the most important indicators relied upon in the analysis is the value of the first dimension variance in 1st contrast, which recorded a value of 2.01, which is an acceptable value indicating the absence of a significant second dimension, thus supporting the unidimensionality assumption.

- **Verification of Local Independence**

Local independence of items was verified through analyzing standardized residual correlations between item pairs. According to the program outputs, the results indicate the highest value r=0.38. Since all residual values fall within the statistically acceptable range of 0.5, this indicates the achievement of the local independence assumption for items, supporting the validity of the model used and indicating that individuals' responses to items were independent of each other after controlling for ability level.

- **Goodness of Fit Indicators/Standard Characteristics**

Table 6: goodness of fit indicators "Related to study sample members Person Fit, and related to study item difficulty parameters Item Fit"

Elements	Period	Standard Error	Internal Fit Statistics INFIT		External Fit Statistics OUTFIT	
			Mean Squares MINSQ	Standardized fit statistic ZSTD	Mean Squares MINSQ	Standardized fit statistic ZSTD
Person Fit						
Mean	1.12	0.79	1.01	0.1	0.93	0.2
Standard Deviation	1.46		0.19	0.7	0.36	0.8
Fit Item						
Mean	0.76	0.83	0.99	0.1	0.93	0.00
Standard Deviation	2.26		0.14	08	0.31	0.8

Source: Winsteps program outputs for data analysis according to the Rasch model

From the table, we find that the mean squares with their statistical value for auditors and items regarding external and internal fit statistics were greater than 0.90, making them within the statistically acceptable range, which shows that auditors' responses are logical and highly compatible with the Rasch model, while the items that carried questions about digital technologies in the field of audit, confirming that the items measured the targeted dimension of auditors' skills in digital technologies to be consistent with the assumptions of the Rasch model. The analysis results also showed that the standard deviation for individuals reached 1.46,

indicating moderate variance in the skill level of auditors in using digital technologies in the audit process, while the standard deviation for items recorded a value of 2.26, indicating that items are graded in terms of difficulty level to measure technical skills used in the audit process, while the standard error recorded values of 0.79, 0.83 for individuals and items respectively, which are considered acceptable.

Conclusion:

The study results based on questionnaire data analysis according to the Rasch model showed that the items were compatible with the model, while the results proved regarding the level of item difficulty that they generally indicate that it is medium difficulty, with variance in the level of auditors regarding digital technologies, and this is due to several factors including training on digital technologies and ways to benefit from them related to the size of the institution and its openness to the digital environment and the experience of auditors, as well as methods used to encourage the acquisition of digital professional certificates that reflect the current needs of the business environment..

RECOMMENDATIONS:

- Professional training in the digital environment field must be intensified to enhance auditors' performance within specialized audit teams to ensure efficiency in performance.
- Update professional education standards to include digital analysis tools and artificial intelligence, as well as accreditation to grant auditors licenses to practice their profession.
- Adopt the results obtained according to data analysis with the Rasch model to identify the most important negatives that must be addressed in the field of evaluating digital technology usage skills.
- Generalize the results extracted using the Rasch model in the field of audit, especially when evaluating cognitive abilities for the reliability it provides in estimating item quality and dimensional measurement.

Bibliography List:

- Arzhenovskiy , S., Bakhteev, A., Sinyavskaya, T., & Hahonova, N. (2019). Audit Risk Assessment Model. *International Journal of Economics & Business Administration (IJEBA), O (Soecial 1)*, 74-85.
- Bambang, W. (2024). Peningkatan Efektivitas Audit melalui teknologi big data: tinjauan literatur. *Jurnal of applied accounting and business, 6*(2), 11-19.
- Chung, T., Zali, M., Yan, R., & Ling Loo, P. (2023). Using the Rasch Model to Calibrate Items for an English as a Second Language Reading Comprehension Computer Adaptive Placement Test. *Vietnam Journal of Educational Sciences, 19*(03), 44-56.
- Edelen, M., & Reeve, B. (2007). Applying item response theory (IRT) modeling to questionnaire development, evaluation, and refinement. *Quality of Life Research, 16*, 5-18.
- Hidayat, W., Fitri, & Bakri, U. (2020). The Analysis of Auditor Emotional Intelligence Using The Rasch Model. *Journal of Management & Business, 3*(3), 342–352.
- khalfallah, H., & bendjelloul, k. (2023). the reality of digital tranformation in algeria : an analysis of international indicators. *,journal of economic and financial research, 10*, 780-781.
- Kokina, J., & Davenport, T. (2017). The emergence of artificial intelligence: how automation is

changing auditing. *Journal of emerging technologies in accounting, 14*(1), 117.

- Kokina, J., Gilleran, R., Blanchette, S., & Stoddard, D. (2019, Septemper 7). *Accountant as Digital Innovator: Roles and Competencies in the Age of Automation.* Consulté le October 15, 2024, sur SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3449720
- Kotivirta, K. (2025). The impact of artificial intelligence on the role of auditors in international audit firms. *Master's Thesis in International Business*. School of Management, Vaasa.
- Linacre, J. (s.d.). *Rasch Analysis and Rasch Measurement software for persons & items*. Consulté le January 16, 2025, sur WINSTEPS: https://www.winsteps.com/index.htm
- Mohd.Yasin, R., Nur Yunus, F., Che Rus, R., Ahmad, A., & Rahim, M. (2015). Validity and Reliability Learning Transfer Item Using Rasch Measurement Model. *Procedia - Social and Behavioral Sciences, 204*, 212-217.
- Pedrosa, J. (2019). The impact of big data and data analytics in external auditing procedures. *master degree in finance*. Lisboa, the Nova University, Portugal.
- Rosnidah, I., Johari, R., Hairudin, N., Hussin, S. H., & Musyaffi, A. (2022). detecting and preventing fraud with big data analytics: auditing perspective. *journal of governance and regulation, 11*, 10-12.
- بوبعاية و شهرزاد(2021) .تحليل البيانات الضخمة باستخدام تقنيات الذكاء الاصطناعي في مهنة التدقيق دراسة حالة شركة Price Waterhouse Coopers. مجلة التكامل الاقتصادي.
- Salijeni, G., Samsonova-Taddei, A., & Turley, S. (2021). Understanding how big data technologies reconfigure the nature and organization of financial statement audits: A sociomaterial analysis. *European Accounting Review, 30*(3), 531-555.