Contribution to the study of the effectiveness of internal audit functions in Moroccan public institutions and companies: A quantitative approach

KERFALI, S.¹

Summary:

This article focuses on the effectiveness of internal auditing in Moroccan public institutions and companies. Resource theory is used to explore the internal factors impacting internal audit effectiveness. The aim is to examine the internal factors influencing the effectiveness of the internal audit function in public establishments and companies.

We attempt to answer the following research question: "What are the internal factors impacting the effectiveness of internal audit functions within public establishments and companies?"

We adopted a post-positivist posture, a hypothetico-deductive logic and a quantitative approach. Data were collected using a questionnaire administered to 120 internal audit unit managers and 120 audit department employees. A total of 240 questionnaires were distributed, of which 230 were valid. Multiple regression was used to analyze the data collected.

The results of the statistical tests showed that the main internal factors impacting internal audit effectiveness were the motivation of internal audit staff, the size of the internal audit team, the use of information technology and the competence of internal auditors. The multiple regression model indicates that, among the internal factors, internal auditor competence is the catalyst for internal audit effectiveness.

Key words: Managerial effectiveness of internal public audit; Public institutions and enterprises; Resource theory; Internal impact factors; Modeling.
Contribution à l’étude de l’efficacité des fonctions d’audit interne dans les établissements et entreprises publics marocains: Une approche quantitative

Résumé:

Cet article porte sur l’efficacité de l’audit interne dans les établissements et entreprises publics marocains. La théorie des ressources est utilisée pour explorer les facteurs internes impactant l’efficacité de l’audit interne. L’objectif est d’examiner les facteurs internes influençant l’efficacité de la fonction d’audit interne dans les établissements et entreprises publics.

Nous essayons de répondre à la question de recherche suivante : "Quels sont les facteurs internes impactant l’efficacité des fonctions d’audit interne au sein des établissements et entreprises publics?"

Nous avons adopté une posture post-positiviste, une logique hypothético-déductive et une approche quantitative. Les données ont été recueillies à l’aide d’un questionnaire administré à 120 responsables des unités d’audit interne et 120 employés du service d’audit. Au total, 240 questionnaires ont été distribués dont 230 ont été valides. La régression multiple a été utilisée pour analyser les données collectées.

Les résultats des tests statistiques ont montré que les principaux facteurs internes impactant l’efficacité de l’audit interne étaient la motivation du personnel d’audit interne, la taille de l’équipe d’audit interne, l’utilisation des technologies de l’information et la compétence des auditeurs internes. Le modèle de régression multiple indique que, parmi les facteurs internes, la compétence des auditeurs internes est le catalyseur de l’efficacité de l’audit interne.

Mots clés: Efficacité managériale de l’audit interne public; Établissements et entreprises publics; Théorie des ressources; Facteurs internes d’impact; Modélisation.
Introduction:

In Morocco, Public Establishments and Enterprises (EEP) occupy an important place in the country’s economic sphere. They are the main players in economic development and in driving the government’s sectoral strategies (Kerfali S. & Gharrafi M., 2022). However, these public organizations are subject to criticism. For example, the Court of Auditors' annual report for 2016, on management control of public establishments and companies, is the subject of notably political debate, on the governance of these organizations. In addition, "...on the one hand, the private sector made efficient and competitive thanks to a management model organized around the notions of monitoring, control and incentives, and, on the other hand, the public sector, particularly public administration, which suffers from weak governance and insufficient productivity." (Extract from the Speech from the Throne by HIS MAJESTY KING MOHAMMED VI, 2020). In response to these various criticisms, a number of reforms were launched to modernize the management and governance mechanisms of public establishments and companies, thereby enabling the State to move from the role of "manager" to that of "guarantor". The aim of these modernization reforms is to lighten state control in favor of control by public establishments and companies, by adopting the techniques used in the private sector, as part of the new public management movement (internal control, internal audit, management control, general accounting to the standards of the General Accounting Standards Code (CGNC), etc.).

In recent decades, internal audit functions have received considerable attention in Western countries. Regulators have applied stricter controls on external audit functions with the aim of leveraging internal audit and improving efficiency (Okodo, Aliu & Yahaya, 2019). As noted by Lenz and Hahn (2015), out of necessity, internal audit has undergone a transformation, becoming an essential part of the corporate environment. In addition, Mihret and Yismaw (2007) argue that most large public sector organizations need an internal audit function to survive. According to Roussy, Barbe and Raimbault (2020), the growing attention paid to the internal audit function and the transformation of internal audit into an indispensable part of business operations are accelerated by the increase in business risk, both inside and outside organizations.

The importance of internal auditing has been widely recognized in Western countries, in both the public and private sectors. Although several studies have been carried out on the effectiveness of internal auditing in developed and developing countries, such studies are rare in the Moroccan context (Kerfali S., 2023). The Moroccan government is focusing its efforts on the creation and development of internal audit departments in all public sector organizations, in order to save public funds and prevent corruption.

This research work examines the internal factors impacting the effectiveness of internal audit functions in public institutions and companies. This research examines the relationship between four internal factors impacting internal audit effectiveness: internal audit staff motivation, internal audit team size, use of information technology and internal auditor competence. In this
sense, the central problem of our research revolves around the following central question:

**What internal factors impact the effectiveness of internal audit functions within public institutions and companies?**

Subsidiary questions arising from our central question are as follows:

- What is the impact of internal audit staff motivation on internal audit effectiveness?
- What impact does the size of the internal audit team have on internal audit effectiveness?
- What impact does the use of information technology have on internal audit effectiveness?
- What impact does the competence of internal auditors have on the effectiveness of internal auditing?

To answer our questions, we will adopt a framework that presents (1) the conceptual approach: the theoretical framework of internal audit effectiveness in public institutions and companies and the internal factors impacting internal audit effectiveness; (2) the methodology: the epistemological posture, the methodological approach and the processing techniques; (3) the research results and their discussion leading to managerial contributions and, we will end with the conclusion.

1. **Conceptual approach**

We present the theoretical framework of internal audit effectiveness in public institutions and companies through the resource-based theory as well as previous studies on internal audit effectiveness and finally the internal factors impacting internal audit effectiveness and performance in public institutions and companies (Kerfali S. & Gharrafi M., 2022).

1.1. **Resource-based theory**

A number of theories have been used in relation to internal audit effectiveness, including agency theory (Adams 1993; Endaya & Hanefah 2013; Okodo, Aliu & Yahaya 2019), resource theory (Alkebsi & Aziz 2017; Alqudah, Amran & Hassan 2019; Nasibah 2015), transaction cost theory (Endaya & Hanefah 2013; Sarens & Abdolmohammadi 2011), resource dependency theory (Dittenhofer 2001; Goodwin-Stewart & Kent 2006), institutional theory (Al-Twajiry, Brierley & Gwilliam 2003; Endaya & Hanefah 2013; Okodo, Aliu & Yahaya 2019) and Marx's circuit theory of industrial capital (Abu-Azza 2012; Mihret, James & Mula 2010). According to Endaya and Hanefah (2013), there is no consensus among researchers on a specific theory associated with internal audit effectiveness. There is also little research on theories that could help build an appropriate theoretical framework for internal audit effectiveness. Resource-based theory is also well suited to examining the internal factors over which the internal audit department has control and which may affect internal audit effectiveness.

In this article, resource theory was also used to explore the internal factors that are under the
control of internal audit departments and affect effectiveness in the Moroccan public sector, namely the motivation of internal audit staff, the size of the internal audit team, the use of information technology and the competence of internal auditors. These tangible and intangible resources significantly affect audit effectiveness, and can be determined according to organizational parameters and internal audit objectives.

Motivation of internal audit staff was the primary internal factor affecting internal audit effectiveness in the present research work. A resource-based approach suggests that promoting internal audits as tangible and intangible resources can help an organization achieve significant success; as such, the organization should provide incentives to its internal auditors to maintain their motivation. The size of the internal audit team is the second internal factor that had an impact on internal audit effectiveness in the present research work; this factor can be a good determinant of the degree of effectiveness. According to the resource-based theory, internal audit departments must be adequately staffed so that team members can perform their tasks effectively and improve the organization's performance (Gharrafi M. & Kerfali S. 2022). Internal audit staff are an essential tangible resource that influences the effectiveness of an organization's internal audit department.

The use of IT was the third internal factor affecting internal audit effectiveness in the present research work; the success of an internal audit function is linked to the resources available, and the use of IT as a strategic tool improves internal audit effectiveness. Resource-based theory supports the idea that information technology should be used to enhance an organization's success and rapidly achieve organizational goals. Internal auditor competence is the fourth internal factor that affected internal audit effectiveness in the present research work; a resource-based theory approach considers that the competence of internal auditors, who are human resources as intangible assets, has an influence on internal audit effectiveness. As intangible assets, human resources are the most important organizational resource; they are a combination of the skills, professional or academic qualifications and experience of all employees. Consequently, internal auditors with strong qualifications and broad skills strongly affect the operational efficiency and reputation of the organization in the Moroccan public sector.

1.2. Internal audit effectiveness

Since internal audit effectiveness is associated with targets and objectives, it has been linked to value-added activities. Al-Twaijry et al (2003) and Mihret, James and Mula (2010) assert that internal audit functions, when applied effectively, add value to organizations by improving operations and enhancing financial performance (Bentalha B., Hmioui A. & Alla Lh 2020). Alzeban and Gwilliam (2014), Dellai and Omri (2016) and Gros, Koch and Wallek (2017) assert that an effective internal audit function helps improve competitive advantage by providing high-quality financial reporting and improving government processes. Therefore, reviewing internal audit effectiveness is essential for two reasons: the first is to assess the quality of performance operations and determine whether the internal audit function is being implemented
satisfactorily. The second is that the review can serve to motivate both the organization and the individual to improve their performance (Mihret et al. 2010).

Consequently, internal audit plays a key role in verifying the soundness of financial and operational controls (Dittenhofer, 2001b). In addition, IIA standards provide a form of assurance that organizations comply with regulations, policies and procedures. All these functions ensure that organizational resources are used efficiently and protected appropriately (Al-Twaijry et al. 2003). According to other research, the effectiveness of the internal audit function is measured by the quality of performance (Alzeban & Gwilliam 2014; Salehi 2016; Bounid S., Ez zouaq rachid., & El kouira chaïmae 2021). This study used a specific measure of internal audit effectiveness based on the quality of performance delivered by internal audit departments, which is in line with Alzeban and Gwilliam (2014). The overall measurement of internal audit effectiveness is undertaken on the basis of various aspects of audit performance, including the ability to plan, the improvement of organizational productivity, the assessment of the consistency of results with set goals and objectives, the implementation of internal audit recommendations, the assessment and improvement of risk management, the evaluation of internal controls and suggestions for improvement.

1.3. Internal factors affecting internal audit effectiveness

As mentioned in previous literature on internal audit effectiveness, there is neither a sufficiently comprehensive framework nor a consensus in the academic world on the essential factors that can contribute to internal audit effectiveness. This research work focused on factors in public institutions and companies, with the aim of providing a comprehensive framework of internal factors impacting internal audit effectiveness, based on resource theory. These factors were classified into four categories, in line with resource theory, namely motivation of internal audit staff, size of internal audit team, use of information technology and competence of internal auditors.

1.3.1. Motivation of internal audit staff

Internal audit staff motivation is the primary internal factor impacting internal audit effectiveness, in line with resource-based theory. Kocman and Weber (2018) define work motivation as "a set of energetic forces that originate both inside and outside an individual's being to initiate work-related behavior and determine its form, direction, intensity and duration". According to Kuvaas et al. (2017), motivation can arise from the desire to perform an activity, with the individual driven by the tangible benefits that come from performing the activity, or from the desire to perform an activity that brings pleasure when performed. Motivation can come from tangible incentives or intangible rewards derived from performing the activity.

Motivated internal auditors are among the key drivers of an organization's competitive advantage. It is therefore essential for organizations to attract highly motivated internal auditors, skilled talent and provide tangible incentives and intangible rewards to internal
auditors to keep them motivated to carry out their responsibilities (Al-Twaijry et al. 2003; Alzeban & Sawan 2013). Competitive incentives can alleviate some of the pressures on internal auditors and help them stay focused to perform their duties. It is essential for organizations to offer competitive packages to their internal auditors. Consequently, it can be concluded that internal auditors are more effective when motivated by tangible incentives and intangible rewards. Based on this conclusion, the following hypothesis is proposed:

\[ H_1. \text{The motivation of internal audit staff has a positive impact on the effectiveness of internal auditing in Moroccan public institutions and companies.} \]

1.3.2. Size of internal audit team

In this research work, the size of the internal audit team is considered as the second internal factor of the resource-based theory that has an impact on internal audit effectiveness. The size of an internal audit function can be a good determinant of the degree of effectiveness. In this regard, Alzeban (2018) and Salehi (2016) emphasize that the audit department must be adequately resourced to carry out its responsibilities effectively. The number of internal audit staff in relation to the quantity of professional responsibilities is a pivotal element in the effectiveness of the internal audit function (Ahmad et al. 2009; Alzeban & Gwilliam 2014; Salehi 2016). According to the IIA (2018), the head of internal audit is responsible for ensuring that internal audit resources are sufficient, as outlined in the International Standards for the Professional Practice of Internal Auditing (ISPPIA) resource management standard. In this respect, internal audit staff are expected to inform senior management of any lack of resources (ISPPIA, standards 2030 and 2230). To ensure an effective internal audit procedure, a sufficient number of auditors should be hired and trained to enhance their professional skills.

A study by Alzeban and Gwilliam (2014) corroborated the findings of several other studies by pointing out that the quality of internal audit work is higher when there are sufficient numbers of staff. According to Nasibah (2015), the quality of internal audit work is greatly enhanced by more staff in the internal audit function, which broadens the scope of internal audit work. Consequently, it is likely that the size of the internal audit team with a large number of employees is anticipated to be more effective than a small number of employees. The hypothesis is formulated as follows:

\[ H_2. \text{The size of the internal audit team (in terms of the number of internal audit staff) has a positive impact on the effectiveness of internal auditing in Moroccan public institutions and companies.} \]

1.3.3. Use of information technology (UIT)

The use of information technology is the third internal factor in the resource-based theory that impacts internal audit effectiveness in this research work. According to Al-Gahtani, Hubona and Wang (2007) and Almasri et al. (2018), technology is ubiquitous and permeates all aspects of personal and professional life. Today's technological advances must be embraced to effectively
manage the evolving and increasingly complex business environment (Curtis et al. 2009). As noted by Cannon and Growe (2004), IT is necessary for the design, implementation and control of many business processes. Financial statements contain a summary of data, which is collected, processed and stored using information technology (IT). Alkebsi and Aziz (2018) stated that most companies are rapidly becoming increasingly dependent on IT through, for example, the use of integrated information systems and electronic document management.

Internal auditors need to collaborate with IT professionals to make the internal audit process more efficient and competitive (Smidt et al. 2018). This view is supported by Alkebsi and Aziz (2018), who suggest that IT can be used to understand basic logic, perform recalculations and fulfill other audit functions, thereby ensuring the quality of financial statements. Consequently, it can be concluded that internal auditing should be more effective when internal audit staff spend more time using IT for internal auditing activities. Based on this conclusion, the following hypothesis is proposed:

\[ H_3. \text{ The use of information technology (in terms of hours of IT use per day for internal audit activity) has a positive impact on internal audit effectiveness.} \]

1.3.4. Competence of internal auditors

In this research work, internal auditor competence is the fourth internal factor in the resource-based theory that impacts internal audit effectiveness. Competence normally refers to the ability of auditors to diligently perform tasks in accordance with professional auditing principles and standards (Drogalas, Karagiorgos & Arabatzis 2015). The IIA refers to competence as an individual's ability to perform a specific task or execute a job appropriately, reflecting a specific set of skills, knowledge and behaviors (IIA 2017). Alzeban and Gwilliam (2014) and Chang et al. (2019) reinforce the IIA’s assertion and previous research, noting that internal auditor competence is attributed to the effectiveness of the internal audit function.

According to resource-based theory, an organization's most valuable resources are its human resources, reflected in the skills, academic or professional abilities and experience of its employees (Kapelko 2005). Consequently, the high-level skills and qualifications of internal auditors would have a profound impact on an organization's operational efficiency and reputation. It is likely that the higher the skills of internal auditors in terms of professional knowledge, employee professionalism, employee proactivity, employee communication, training and qualifications, the higher the effectiveness of internal auditing. This leads to the following hypothesis:

\[ H_4. \text{ The competence of internal auditors has a positive impact on the effectiveness of internal auditing in Moroccan public institutions and companies.} \]
We summarize our hypotheses in this paper.

H1: Internal audit staff motivation has a positive impact on internal audit effectiveness in Moroccan public institutions and companies.

H2: The size of the internal audit team (in terms of the number of internal audit staff) has a positive impact on the effectiveness of internal auditing in Moroccan public institutions and companies.

H3: The use of information technology (in terms of hours of computer use per day for internal audit activity) has a positive impact on internal audit efficiency.

H4: The competence of internal auditors has a positive impact on the effectiveness of internal auditing in Moroccan public institutions and companies.

These hypotheses enable us to develop a hypothetical model that will represent our analytical framework.

- Analytical framework

We borrow from resource theory (Alkebsi & Aziz 2018; Alqudah, Amran & Hassan 2019; Nasibah 2015), to define our analytical framework which will show the influence of internal audit staff motivation, internal audit team size, use of information technology and internal auditor competence on internal audit effectiveness.

![Figure 1: Internal Impact Factors-Internal Audit Effectiveness Model](source: Authors 2023)

2. Research methodology

In what follows, we present our epistemological posture, the logic of our approach and our methodological approach, and finally we specify our data processing techniques.

2.1. Epistemological posture, methodological approach and processing techniques

Our post-positivist posture in effect, we attempt to answer the question: "What are the internal factors that impact the effectiveness of the internal audit function within public institutions and companies? "We mobilize resource theory (Alkebsi & Aziz 2018; Alqudah, Amran & Hassan 2019; Nasibah 2015), to define our analytical framework which will show the influence of internal audit staff motivation, internal audit team size, use of information technology and internal auditor competence on internal audit effectiveness. 

![Figure 1: Internal Impact Factors-Internal Audit Effectiveness Model](source: Authors 2023)

2. Research methodology

In what follows, we present our epistemological posture, the logic of our approach and our methodological approach, and finally we specify our data processing techniques.

2.1. Epistemological posture, methodological approach and processing techniques

Our post-positivist posture in effect, we attempt to answer the question: "What are the internal factors that impact the effectiveness of the internal audit function within public institutions and companies? "We mobilize resource theory (Alkebsi & Aziz 2018; Alqudah, Amran & Hassan 2019; Nasibah 2015), to define our analytical framework which will show the influence of internal audit staff motivation, internal audit team size, use of information technology and internal auditor competence on internal audit effectiveness.
2019; Nasibah 2015) to argue that the motivation of internal audit staff, the size of the internal audit team, the use of information technology and the competence of internal auditors can affect the effectiveness of internal auditing in public institutions and companies. We adopt a hypothetico-deductive logic, with the aim of designing an explanatory model of the internal auditing influence-effectiveness complex. With regard to the methodological approach, we adopt Kumar's (2011) point of view, which emphasizes: "One of the significant differences between quantitative and qualitative research lies in the availability of methods and procedures for measuring attitudes.

In quantitative research, there are a number of methods that can be used to measure attitudes, but qualitative research lacks methodology in this aspect, mainly because its aim is to explain rather than to measure and quantify [...] Attitudinal scales are used in quantitative research to measure attitudes. We therefore adopt a quantitative methodological approach, as we seek to examine the internal factors affecting the effectiveness of internal auditing in public organizations, first through a typology obtained by the statistical technique of factor analysis, principal component analysis (PCA), which is a quantitative and exploratory technique. Modelling is then based on the statistical technique of multiple regression, which is also quantitative. The software used is Statistica.

2.2. Data used

We used a questionnaire consisting of 49 closed, multi-scale questions. These questions concern:

- on the effectiveness of internal auditing, inter alia: Internal auditing examines operations and programs to check whether results are in line with pre-established objectives and goals?, internal auditing draws up appropriate annual audit plans?, internal auditing examines compliance with applicable external laws and regulations?, give the level on a scale of 1: weak to 5: strong for each of these in your department(s).

- on the motivation of internal audit staff: My job is very exciting, the work is very exciting, the tasks I perform at work are a strong driving force in my work, give the level on a scale of 1: weak to 5: strong.

- on the size of the internal audit team: What is the number of employees working in the internal audit department? give the level on a scale from 1: low to 5: high.

- on the use of information technology: How many hours a day is IT used for internal audit activities? give the level on a scale from 1: low to 5: high.

- on the competence of internal auditors: The professional knowledge of internal auditors is high, internal auditors are considered as professionals, internal auditors are proactive, etc., give the level on a scale from 1: weak to 5: strong.
This questionnaire was administered to a sample of 120 internal audit unit managers and 120 internal audit department employees from public institutions and companies. The sample was selected at random.

2.3. Variables used

Kumar (2011) argues that developing an attitudinal scale is problematic. We can decide which aspects should be included in the measurement of attitudes towards an issue, how the answers given by a respondent should be combined to determine the overall attitude, and how to ensure that the scale developed actually measures attitude towards the said issue (Kumar, 2011). There are three main types of scales that measure attitude: the Likert scale, the Thurstone scale and the Guttman scale (Kumar, 2011). The Likert scale is the most commonly used, as it is the easiest to construct (Kumar, 2011). The main assumption of this scale is that each element is equally important.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Measurement items</th>
<th>Opérationalization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivating internal audit staff (MOTS)</td>
<td>Tangible incentives and intangible rewards.</td>
<td>Likert scale with five levels</td>
</tr>
<tr>
<td>Size of internal audit team (SIZE)</td>
<td>Number of internal auditors.</td>
<td>Likert scale with five levels</td>
</tr>
<tr>
<td>Use of information technology (UIT)</td>
<td>Number of hours of IT use per day for internal audit activity.</td>
<td>Likert scale with five levels</td>
</tr>
<tr>
<td>Competence of internal auditors (COMP)</td>
<td>Professional knowledge, employee professionalism, employee proactivity, employee communication, training and qualifications.</td>
<td>Likert scale with five levels</td>
</tr>
<tr>
<td>Internal audit effectiveness (IAE)</td>
<td>Ability to plan, to improve the organization’s productivity, to assess the consistency of results with the goals and objectives set, to implement internal audit recommendations.</td>
<td>Likert scale with five levels</td>
</tr>
</tbody>
</table>

Source: Authors 2023

3. Results and discussion

The results we present are twofold. The first part is a typology or categorization of the factors having an impact on the effectiveness of the internal audit resulting from the principal component analysis. The second part is a statistical regression modelling, which takes up the whole of the previous analytical framework to define the different relationships in order to study the effects of top management support, organizational culture and internal audit independence on internal audit effectiveness. We then discuss the results and highlight the managerial contributions.
3.1 PCA processing results and factor typology

Principal component analysis allows us to reduce the amount of information obtained, the most relevant to further explain the attitudes and behaviors of the public officials interviewed, and it also allows us to create a typology by categorizing the internal factors having the greatest impact on internal audit effectiveness. We present the correlation circle and the graph of individuals.

![Correlation circle and graph of individuals](image)

Source: Authors 2023, graphs from Statistica software

3.2 Modelling and interpretation of multiple regression

The regression modelling of the explained variable internal audit effectiveness "IAE" as a function of the explanatory variables staff motivation "MOTS", internal audit team size "SIZE", use of information technology "UIT" and internal auditor competence "COMP", is summarized in Table 2. The explained variable internal audit effectiveness "EAI" is explained by the explanatory variables staff motivation "MOTP", internal audit team size "SIZE", use of information technology "UTI" and internal auditor competence "COMP".

![Internal impact factors - Internal audit effectiveness](image)

Source: Authors 2023
Table 2: Regression results for independent variables

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients a</th>
<th>Standardized coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-standardized coefficients</td>
<td>Standardized coefficients</td>
</tr>
<tr>
<td>(Constant)</td>
<td>B</td>
<td>Erreur std.</td>
</tr>
<tr>
<td>MOTS</td>
<td>0.168</td>
<td>0.051</td>
</tr>
<tr>
<td>SIZE</td>
<td>0.056</td>
<td>0.014</td>
</tr>
<tr>
<td>UIT</td>
<td>0.143</td>
<td>0.032</td>
</tr>
<tr>
<td>COMP</td>
<td>0.263</td>
<td>0.051</td>
</tr>
</tbody>
</table>

Source: Authors 2023

As shown in Table 2, the beta values of the internal factors MOTS, SIZE, UIT and COMP; these beta values are also statistically significant (p < 0.01). The beta values of these internal variables were 0.163, 0.214, 0.242 and 0.272 respectively, implying that the main driver among the internal dependent variables was the competence of the internal auditors. The p-value for MOTS was significant (p < 0.01), confirming Hypothesis 1. The p-value for SIZE was also significant (p < 0.01), confirming Hypothesis 2. The p-value for UIT was also significant (p < .01), confirming hypothesis 3. Finally, the p-value for COMP was also significant (p < 0.01), confirming hypothesis 4. These results show a strong positive correlation between the four internal independent variables and the dependent variable.

3.3. Discussions and managerial implications

We discuss the results of the research on the basis of decisions relating to our hypotheses.

Internal audit staff motivation has a positive impact on internal audit effectiveness. This result is also aligned with previous studies (Al-Twajiry et al. 2003; Alzeban & Sawan 2013; Brierley et al. 2001; Masood & Lodhi 2015) that have identified internal audit staff motivation as one of the main determinants of internal audit effectiveness. Masood and Lodhi (2015), for example, suggest that motivation powerfully influences internal audit effectiveness. This research found that offering promotions and paying appropriate salaries to internal auditors improved internal audit effectiveness. Consequently, the results of this research work indicate that the motivation of internal audit staff significantly affects the effectiveness of internal auditing in public institutions and companies. A resource-theoretic approach suggested that promoting internal auditing as a tangible and intangible resource can help organizations achieve significant success; as such, the organization should provide incentives to its internal auditors to maintain their motivation.

The size of the internal audit team has a positive impact on internal audit effectiveness. This finding is consistent with previous studies (Ahmad et al. 2009; Alzeban & Gwilliam 2014; Alzeban & Sawan 2013; Brierley et al. 2001; Salehi 2016), all of which found that the size of the internal audit team had a profound impact on internal audit effectiveness. Brierley et al. (2001), for example, point out that internal audit departments in the Sudanese public sector are...
understaffed, which limits their effectiveness. A study of Malaysian public sector organizations came to similar conclusions; the problem of a lack of auditors was quite obvious and limited the success of internal auditing (Ahmad et al. 2009). In this study, questionnaire responses from internal auditors working in the Malaysian public sector suggested that, with the support of senior management, internal audit departments should be allocated a sufficient number of staff, as well as the other resources they need, to effectively discharge their responsibilities. In line with resource-based theory, internal audit departments must be adequately staffed in order to perform their functions effectively and improve the organization’s performance. These results indicate that the sufficient number of employees in internal audit departments, as a vital tangible resource, influences the effectiveness of an organization’s internal audit department in the Moroccan public sector.

The use of information technology positively impacts internal audit effectiveness. The result is also aligned with previous studies (Alkebsi and Aziz 2018; Hermanson, Hill and Ivancevich 2000; Smidt et al. 2018; Weidenmier and Ramamoorti 2006), all of which have identified the use of information technology as an important determinant of internal audit effectiveness. According to Alkebsi and Aziz (2018), for example, internal audit effectiveness in Yemen’s public sector is significantly impacted by the use of IT. This research work revealed that the time internal audit employees spend using IT is proportional to internal audit effectiveness. Furthermore, the use of IT has a positive influence on the prestige of auditing tasks within an organization (Weidenmier & Ramamoorti 2006). Consequently, a resource-theoretic approach suggests that the use of IT as a strategic tool has a positive impact on the effectiveness of internal auditing. The results also indicate that the success of an internal audit function is linked to the resources at its disposal, and that IT is one of these essential resources. Resource-based theory supports the idea that IT, as a resource, should be used to increase an organization’s success and rapidly achieve its objectives.

- The results obtained enable us to propose as managerial contributions that the motivation of internal audit staff, the size of the internal audit team, the use of information technology and the competence of internal auditors be increasingly analyzed and taken into account by public managers in order to hope for the effectiveness of internal audit, and even of the organization;

- Taking our findings a step further, we propose that public managers offer financial incentives to internal auditors, such as bonuses, promotions, pay rises, financial compensation, overtime and additional remuneration.

- The number of employees reporting to the internal audit department (men and women) is insufficient. This makes it difficult for auditors to do their job effectively. These problems could be solved by recruiting new male and female employees to the internal audit departments. Another solution would be to allow male auditors access to female departments, or to create an appropriate environment in both male and female departments. Authorities could also take a more concerted approach to filling the shortage of qualified internal auditors by
attracting qualified internal auditors from neighboring countries.

- The results of this research work confirm that information technology is not sufficiently used in internal auditing in the Moroccan public sector, and that internal audit departments often lack appropriate IT resources. These are major problems. Therefore, public institutions and companies should provide advanced audit software to internal audit departments. This software should be directly connected to external control bodies, and employees reporting to the internal audit department should have access to all internal audit department transactions. Internal auditors should also receive comprehensive training from Moroccan and foreign universities and private sector experts.

- Many internal auditors in the Moroccan public sector lack skills. The shortage of competent internal auditors is also reflected in the methods used to recruit audit staff, the lack of ongoing training and the absence of continuing education. The Moroccan public sector should take steps to improve the skills of internal auditors, for example by enabling internal audit functions to set recruitment criteria and hire suitably qualified staff, providing employees with ongoing professional development, giving internal auditors the opportunity to improve their educational qualifications, and offering employees inclusive training sessions at universities and private sector audit firms.

Conclusion and perspectives:

At the end of this research, we come back to the fact that we tried to link the four factors: motivation of internal audit staff, size of internal audit team, use of information technology and competence of internal auditors in order to see their effects on internal audit effectiveness. To do this, we tried to answer the question: What are the internal factors that impact the effectiveness of internal audit functions within public establishments and companies? We mobilized the literature, resource theory (Alkebsi & Aziz 2018; Alqudah, Amran & Hassan 2019; Nasibah 2015) to justify the link between internal impact factors and internal audit effectiveness (Ahmad et al. 2009; Alzeban & Gwilliam 2014; Alzeban & Sawan 2013; Brierley et al. 2001; Salehi 2016). Four hypotheses were deduced from these rationales. To answer the research question, we adopted a post-positivist posture and a hypothetico-deductive logic. The methodological approach used is quantitative, with data collected by administering a questionnaire to a sample of 120 internal audit unit managers and 120 employees reporting to the internal audit department. These data were processed using two techniques, principal component analysis to categorize internal impact factors, and multiple regression to model the empirical relationship between these factors and internal audit effectiveness.

We obtained the following results: there is a positive and direct relationship between the four factors in this research. Four hypotheses concerning the impact of internal factors on internal audit effectiveness were also tested using multiple regression analysis. The results of this analysis confirmed the four hypotheses concerning the motivation of internal audit staff, the size of the internal audit team, the use of information technology and the competence of internal auditors. In line with the resource theory, the internal factors that had an impact on the
effectiveness of internal auditing were as follows: the motivation of internal audit staff, the size of the internal audit team, the use of information technology and the competence of internal auditors all contributed to the effectiveness of internal auditing. Among internal factors, the competence of internal auditors was the main driver of internal audit effectiveness. In line with resource-based theory, Moroccan public organizations should capitalize on effective internal auditing to support organizational objectives and gain competitive advantage.

To the research question, what are the internal factors that impact the effectiveness of internal audit functions within public establishments and companies? We answer, in our context, that the motivation of internal audit staff, the size of the internal audit team, the use of information technology and the competence of internal auditors have a positive impact on the effectiveness of internal audit functions within public establishments and companies.

We note a weakness in this work concerning the modeling technique, which is multiple regression, where the p-value of some variables is greater than 0.05, making these variables insignificant for modeling. However, we have kept these results, which give an overall trend for these variables, for illustrative purposes.

In terms of research prospects, we feel it would be judicious to propose the structural equation technique to take the variables simultaneously, in order to bring out the negative and positive effects between the variables that multiple regression does not take into account. In addition, a larger sample size would make it possible to increase the significance of certain non-significant variables.

At the end of this research article, and beyond the richness of the contributions we have made, it is important to admit that it is not without its limitations. Among other things, some participants were unable to answer all the questions in the questionnaire due to time constraints or perhaps a lack of adequate knowledge about the study. This last point was discussed with all participants who contacted us by phone.
Bibliography:

Abu-Azza, W (2012), Perceived effectiveness of the internal audit function in Libya, University of Southern Queensland, Australie.


