

A study on the Impact of Remote Work on Internal Control Effectiveness in Ireland's Financial Sector

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A STUDY ON THE IMPACT OF REMOTE WORK ON INTERNAL CONTROL EFFECTIVENESS IN IRELAND'S FINANCIAL SECTOR

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Abstract

The Right to Request Remote Work Bill by the Irish government in 2021 will make teleworking a regular feature of the Irish workforce. Although, the effects of increased teleworking can be significant, more employees teleworking means less employees being actively monitored. Industry reports from an occupational fraud survey on profit, and nonprofit sector in Ireland conducted in February 2019 revealed that about half the business leaders who participated in the poll encountered workplace fraud and abuse the past two years because of internal control weakness. This study evaluates internal controls between office-based, hybrid and remote work arrangements in Ireland's Financial sector using a quantitative survey to pairwise compare and ascertain how effective current internal controls are in the increasingly hybrid work environment. The study finds internal control effectiveness to vary largely across the three working arrangements. The results support existing literature on internal control effectiveness and reveals new insights. However, some organizations, regardless of how effective their internal control may still encounter workplace fraud.

1 Introduction

1.1 Background to the Study

The effects of the COVID-19 pandemic on the workplace are interminable, as company operations are increasingly performed in remote work environments (Gong *et al.*, 2022). Working from home (WFH) is now vital to company activities and will remain so for the long run (Rodman, 2021). In 2021, the McKinsey Global Institute reported that around 30% of individuals in major economies may WFH post the pandemic (McKinsey, 2021). With the introduction of the Right to Request Remote Work Bill by the Irish government in 2021 WFH will become a regular feature of the Irish workforce (Department of Enterprise Trade and Employment, 2022). The effects of increased teleworking can be significant. The flexibility of remote employment may help vulnerable groups and other disadvantaged individuals may be given the opportunity to work in places where they previously could not. Flexibility, on the other hand, leads to less natural staff

supervision. When more people WFH, fewer staff are actively monitored, potentially increasing the risk profile of financial institutions (Wronka, 2021). Internal controls are crucial in organization's because they are proven cost-effective strategies for managing a company's risk profile daily (Maulidi and Ansell, 2022). The framework of internal control designed by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) is the most extensively used by private and public sector organizations (Shonhadji and Maulidi, 2022). The five interrelated components of the COSO framework are the control environment, risk assessment, control activities, information and communication, and monitoring (Mendes de Oliveira *et al.*, 2022). The five components of the COSO framework, according to Maulidi (2022), are pivotal for managing an organization's risk profile; nevertheless, these components were originally established with the in-office surrounding as a basis for risk assessments, but things have changed (Rodman, 2021). The extensive adoption of remote work is the rationale for examining how effective present internal controls perform in an increasing hybrid work environment.

1.2 Motivation of Study

An occupational fraud survey on the private, public, listed, and nonprofit sectors in Ireland was carried out in February 2019 by Mazars reported that about half of the business leaders who participated in the poll encountered workplace fraud and abuse over the previous two years (MAZARS, 2019). Figures from the study also revealed that, while previously established internal controls discovered a considerable level of internal fraud, these control mechanisms were mostly ineffective. In 2022, more organizations are returning employees to the office on a hybrid basis, with a few remaining entirely remote. Research on internal controls frequently examines audit quality, occupational fraud, or effectiveness of controls (Suh, Nicolaides and Trafford, 2019), (Nawawi and Salin, 2019), (Maulidi and Ansell, 2020). Existing literatures are yet to link internal control functions to WFH. Given this, it is imperative for the present study to investigate this gap.

This present study is primarily focused on analyzing Internal Control Effectiveness (ICE) of businesses in Ireland's financial sector. The study shall compare ICE between office-based and remote work arrangements to understand how existing internal controls perform in the new work environment. We shall adopt the use of a quantitative survey to measure ICE in Ireland's financial sector. The survey shall be sent to senior level employees in Ireland's financial industry who influence policy around their organization's internal controls and have experience working remotely and/or within the company's office. The survey comprises 25 questions relating to ICE, all of which are based on the five COSO components. This research will help companies in Ireland's financial industry as they adjust to this new work environment. Data gathered here will help these companies proactively protect themselves, their customers, employees, and their data.

1.3 Research Question and Objectives

"To what extent are office-based internal controls effective in the remote work environment in Ireland's financial sector"

The research objectives are:

- To assess the effectiveness of internal controls in remote work environments versus the office-based environment.

- To evaluate the relationship between major activities under the five internal control components of COSO and ICE.
- To assess the impact of alternative control activities on ICE.
- To add to the theoretical understanding and body of literature on internal controls.

1.4 Research hypothesis:

H01. There is no difference in ICE across full-remote, on-site and hybrid work arrangements.

The study aims to conduct a comprehensive analysis using primary data acquired from survey responses, however it is hampered by data scarcity as some individuals chose not to respond because doing so violated the company policy.

The remainder of this document is organized as follows:

- The state of the literature is covered in Section 2 and demonstrates how current research is compared.
- Sections 3 discuss the methodology, design specification, and implementation, in that order.
- Section 4 presents the results and evaluation.
- The limitations conclusion and suggested future works are presented in Section 5-7.

2 Literature review

2.1 Internal Controls in a Remote Work Environment

The business environment in recent times has witnessed rapid developments that influence the way their operations are executed, thus making problems like fraud more complex than they were (Nawawi and Salin, 2018). Internal controls with a blend of preventive and investigative actions can reduce an organizations susceptibility to workplace fraud (Suh, Nicolaidis and Trafford, 2019). However, the major shift to WFH during the COVID-19 pandemic elevated financial institutions' risk profile (Karpoff, 2021). Cases from throughout the world have revealed the financial industry's internal weaknesses (Suh, Nicolaidis and Trafford, 2019). Over 2,500 fraud cases from around the world were examined in a report released by the Association of Certified Fraud Examiners in 2018 (Denman, 2019). The researchers discovered that absence of internal controls was the primary reason of internal control vulnerability for approximately 30% of respondents. Over 65% of organizations reported fraud events in 2022, according to PriceWaterhouseCoopers, (2022) annual fraud survey of which nearly 30% were cases of collusion among internal and external parties.

The most obvious indication of how WFH alters things is risk assessments. Offices, which served as the basis for risk assessments and the actual locations that Parker, (2020) recognized as crucial locations for the exercise of control, are less common in most enterprises today. Companies are currently forced to reform their controls systems and practices. The adoption of videoconferencing tools allows many businesses to essentially reproduce their offline monitoring procedures online (Kafel and Rogala, 2022). Lessons learned from remote auditing in the pandemic demonstrates that online monitoring is inadequate especially in comparison to

conventional methods (Castka, Searcy and Fischer, 2020). According to Hafermalz, (2021), employees who WFH may exhibit harmful behaviors such as overcommitting because they wish to stand out to their managers by working excessively hard.

Delfino (2021) examined the effect of WFH on control systems in professional services firms using a survey and reported that the move to teleworking upended preexisting structures and resulted in harsher, more repressive control over workers. A large dependence on technologies for staff monitoring may have unforeseen results like stress and fear (Hafermalz, 2021). Remote trust-building is not only more difficult, but it also falls short when compared to the richness and depth of face-to-face communication (Marsh, Vallejos and Spence, 2022). Gong, (2022) compared internal controls, particularly audit quality of accounting companies, before and after the pandemic using benchmark reports from the same firms and discovered that the transition to WFH reduced audit quality after the pandemic. The growing hybrid environment will have many hurdles to resolve, thus fundamental corporate cultures must be present for its success(Gomber *et al.*, 2018).

According to Wronka, (2022), the pandemic exacerbated the risk of unethical corporate governance activities. Economic and financial catastrophes could occur more frequently if financial firms are not properly inspected. Majority of crucial banking operations for example demand the physicality of inspectors but WFH makes misconducts unobtrusive (Hughes, 2021). Organisations must continuously develop practical strategies that make internal controls effective to mitigate risks associated with remote work environments, and that of occupational fraud (Nawawi and Salin, 2018),(Gong *et al.*, 2022).

2.2 The functionality of Effective Internal Controls

Internal controls are crucial in organization's because they are proven cost-effective strategies for managing a company's risk profile daily (Maulidi and Ansell, 2020). COSO extended the scope of internal controls in 2019 to account for the numerous unanticipated developments in the business environment (Mendes de Oliveira *et al.*, 2022). Internal control is a procedure intended to give adequate confidence that goals pertaining to compliance, operations and reporting will be met (Denman, 2019). The modification to the definition aims to guarantee the accuracy of organizational data, the dependability of financial reporting, and the compliance of plan operations with relevant legal requirements (Maulidi and Ansell, 2022).

The effectiveness of organizational internal control in reducing opportunities for fraud operations is demonstrated by recent empirical evidence. Al-Dhamari (2018) used a regression model and secondary data from listed Malaysian companies to evaluate the significance of the Internal Audit Function (IAF) in preventing shareholders in Malaysia from seizing financial resources. The researchers found that the IAF is crucial in preventing perverse incentives and unethical behavior. Additionally, Kupec *et al.*, (2021) employed an online quantitative poll directed at senior management to investigate the effects of auditing and control on business performance in contemporary literature. The study found that the auditing and control processes significantly increase return on equity. Using a quantitative method and secondary dataset from 32 commercial banks, Quoc Trung, (2021) examined the effect of internal controls on commercial bank credit risk in Vietnam. Internal controls were discovered to significantly influence bank credit risk. The five interrelated components of the COSO framework significantly impact the process of identifying the existence unobtrusive fraud concealment, making the most distinguishing characteristics of the framework.

2.3 The COSO Internal Control Framework

The five internal control components of the COSO framework are intended to provide sufficient assurance that outcomes pertaining to compliance, operations and reporting will be met. They are discussed as follows in this study, in accordance with COSO:

Control Environment

The control environment refers to the rules, practices, and hierarchies that form the cornerstone for internal controls across the organization (Mendes de Oliveira *et al.*, 2022). This component is characterized by the mindset, dedication, engagement, and support demonstrated towards internal control by an organization's senior management (Al-Dhamari *et al.*, 2018). In essence, it is the atmosphere at the top. For example, it's improbable that lower-level employees of a company will take internal controls seriously if the CEO and top management don't seem to be interested in doing so.

However, if senior executives behave ethically and take internal controls seriously, it will have a favorable and supporting effect on the entire organization's behavior toward internal controls (Mendes de Oliveira *et al.*, 2022Th). Denman, (2019) argues that because senior executives have the authority and competence to bypass safeguards to commit fraud, a poor atmosphere at the top is the main contributing factor in cases of financial statement fraud. Villaescusa (2022) uses a qualitative survey to gather responses from perpetrators of an accounting fraud case and reports that the company's board and audit committee were intentionally designed to have no control over management decisions, allowing financial information to be manipulated.

This validates Denman, (2019) conclusions that senior executives have the authority and expertise to obfuscate fraud from auditors and extend its duration. The need for the next component of the framework is justified by the likelihood or occurrence of such risks. Organizations need a method for recognizing and controlling the risks that it confronts (Chhabra Roy and Prabhakaran, 2022)

Risk assessment

The purpose of the risk assessment component is to recognize, analyze, and classify both internal and external risks (Mendes de Oliveira *et al.*, 2022). Risks are evaluated based on departments, procedures, and operations to determine the adequate control activity for controlling the identified risk (Chhabra Roy and Prabhakaran, 2022). For example, an organization might choose to examine the risk of financial statement fraud, if they believe that management may be manipulating the estimates of depreciation, and that could impact the company's internal controls. Understanding the factors that could lead to fraud referred to as the Fraud Triangle helps determine the risk of occupational fraud (Nawawi and Salin, 2018).

Control Activity

The control activity component acts as a system to manage identified risks and ensure that standards are being adhered to (Mendes de Oliveira *et al.*, 2022). Control activity, such as pre-employment screening, certificate verification, activity segregation, and fraud education, are business-developed systems others may be technology dependent (Hosain, Liu and Mustafi, 2021) (Chhabra Roy and Prabhakaran, 2022). However, simple control measures might be ineffective

for fraud prevention. According to Maulidi (2022) a better instrument to encourage employees to report unlawful behavior is a whistleblowing system but whistleblower protection has received minimal consideration, even though whistleblowing mechanisms are thought to be a key control for identifying dishonest financial reporting (Maulidi and Ansell, 2020).

Roy (2020) highlights thoughtful policies for employees such as rewards for whistleblowers and employee support programs to disrupt the cycle of fraudulent behaviors. The absence of such incentives will make a whistleblower conceal their motivation to expose wrongdoing because of the repercussions that might follow (Tuan Mansor, Mohamad Ariff and Hashim, 2020). A favorable environment for internal controls can be established through training programs for employees (Chhabra Roy and Prabhakaran, 2022), although given the rise in high-profile corporate frauds, some employers consider fraud training to be a waste (Sahloul, Self and Simmons, 2019; Rameem Zahra *et al.*, 2021).

Information and Communication

The component of information and communication are activities that involve defining incidents and notifying connected parties about the actions to be taken (Mendes de Oliveira *et al.*, 2022). ICE relies heavily on information and communication (Al-Dhamari *et al.*, 2018). For example, if senior management does not sufficiently communicate internal control responsibilities to employees or if there is no formal policy handbook outlining procedures to apply, the controls become ineffective (Xiwen, Xu and Shiyu, 2021).

Similarly, if the organization's accounting system generates financial data with missing dates of journal entries, the quality of the financial data provided may suffer (Xiwen *et al.*, 2021). As a result, the information supplied must be exact and conveniently accessible to everyone who need it (Mendes de Oliveira *et al.*, 2022).

Monitoring

The monitoring component evaluates the effectiveness of internal controls because it is inadequate to implement internal controls without monitoring them (Maulidi and Ansell, 2020). Internal controls must be examined continuously to establish if employees are using controls as intended or if implemented controls are active in capturing any errors or misstatements (Kam, Yining and Boahua, 2020). This involvement of the internal audit in this component is highly significant because it bears the responsibility of verifying ICE (Mendes de Oliveira *et al.*, 2022).

Christensen (2022) emphasizes that monitoring efforts, particularly internal audits, have a significant impact on the effectiveness of internal controls. (Khamainy, Ali and Setiawan, 2022) used the Beneish M-Score to assess financial statement fraud in traded Indonesian Stock Exchange industrial companies and discovered that an independent committee's oversight is a highly effective strategy for corporations to reduce fraud.

Additional monitoring techniques like surprise audits are also effective deterrents to fraud and other misconduct (Nawawi and Salin, 2018). Following the pandemic, some businesses elected to replace physical audits with virtual monitoring processes (Farcane *et al.*, 2022). While virtual audits can be effective, the quality of the inspection carried out is assumed to be subpar because the availability of detailed financial information is constrained (Wronka, 2022).

2.4 The Opportunity Element of Fraud in Weak Internal Controls

A typical reason for employee malfeasance are weak internal controls (Chhabra Roy and Prabhakaran, 2022). Internal fraud, according to studies, is triggered by specific conditions in an organization, and identifying these factors are critical in averting repeat cases of fraud (Denman, 2019). An individual is more inclined to perpetrate fraud if they perceive weakness in their organization's defenses (Maulidi and Ansell, 2020). If effectively designed, internal controls can be a valuable mechanism for reducing an organizations risk profile (Maulidi and Ansell, 2022).

The fraud triangle created by Donald Cressey in 1950 depicts how fraud requires the coexistence of three different components (Kagias *et al.*, 2022). The fraud triangle's first component of pressure refers to the tension and strain that leads someone to commit fraud (Nawawi and Salin, 2018). The triangle's third component of rationalization involves individuals seeking to defend their dishonest behavior using widely held beliefs in the workplace (Davis and Harris, 2020). The triangle's component of opportunity is the second and most important when analyzing a firm's risk management system (Maulidi, 2020).

The component of opportunity is stated by (Villaescusa and Amat, 2022) as the perception that Internal controls are ineffective, and the likelihood of fraud detection is low. Suh (2019) asserts that an individual's desire to commit crime decreases as the opportunity component becomes more difficult. Thus, fraud is more likely where ICE is low (Nawawi and Salin, 2018)(Kagias *et al.*, 2022). When internal controls are ineffective, illegal activity may thrive occasionally and go unreported for a year or over four years (Chhabra Roy and Prabhakaran, 2022).

However, the fraud triangle has been subjected to extensive empirical investigation, and most academics have questioned it, primarily because the first and third components, motivation and rationalization, are less apparent and unmeasurable (Suh, Nicolaides and Trafford, 2019) (Davis and Harris, 2020). Kagias *et al.*, (2022) asserts that the fraud triangle is overly generic and, more crucially, fails to focus on the psychological desires that the criminal may attempt to conceal.

Fraud occurrence and techniques evolve dynamically and although current prevention methods are highly successful, they can also be ingenious in dealing with the dynamic nature of frauds (Chhabra Roy and Prabhakaran, 2022). Businesses must adapt existing operating models to reflect a digital strategy alongside internal controls to become an agile, innovative function (Christensen, 2020).

3 Methodology

In this study, a descriptive method was utilized to explain various attributes of the population sample. Data for the study was collected through an online survey created using Google Forms. The study gathered primary data by sharing the link of the online survey to participants on social media networking applications such as WhatsApp and LinkedIn. The questionnaire was designed to gather data based on several components that were established from other current literature on the topic of interest. The objective of the questionnaire was to get responses from senior level employees who influence policy around their organization's internal controls and work remotely and/or within the company's office. In this study COSO components were used to analyze the effectiveness of internal controls in Ireland's financial sector. The factors included in this study for the analysis are 'control environment', 'risk assessment', 'control activity', 'information and communication' and 'monitoring'

3.1 Sample Size

To assess the effectiveness of internal controls, X reliable replies were gathered via an online survey, and a pre-test on a sample of 35 responses was undertaken to evaluate the methods. The data for the research was obtained using the snowball sampling approach.

3.2 Scales and Measurements

The study used a seven-point Likert scale in the online survey ranging from 'Strongly Disagree' to 'Strongly Agree' to gather accurate responses from participants. The questionnaire was divided into different sections to collect demographic data and information regarding the effectiveness of their organizations existing internal controls. Multiple choice questions with 'Yes' and 'No' responses were included to know if certain control activities were observed by organizations or not. 'I don't Know' was added as a response option for multiple choice questions to avoid ambiguity. Additionally, questionnaires were designed with questions to avoided bias and guarantee that only reliable data was used in the study. In this manner, it was determined that participants had properly completed the survey.

3.3 Population

The target population for the first questionnaire are respondents residing in Ireland, who are employed and work from home, work from the company's premises or work from home and the onsite office (hybrid) within the age group of 18 - 65. They were targeted to analyze how effective the existing internal controls of their organization functions

3.4 Statistical Techniques Used for the Analysis

The correct choice of statistical test is related to the scale level requirements. The following statistical techniques have been used in this study for analysis.

- **Descriptive statistics** is used to evaluate, summarize, and report data set properties such as mean and standard deviation. Descriptive statistics is also used in this study to report statistical results of grouped variables.
- **The Shapiro-Wilk Test** is a nonparametric statistical test used for detecting all deviations from normality in a data. The test is conducted to determine the normal distribution of variables in a data. In this study, the Shapiro-Wilk Test is used to ascertain if continuous/ordinal variables are normally distributed or not
- **Spearman Rank Correlation-Coefficient Test** is a non-parametric test used to determine the direction and intensity of the association between two ranking variables. It is used over the Pearson correlation test if the distribution of the population is rejected for normality or if a data's scale contains different measurements. For this study, the Spearman Rank Correlation test is conducted to confirm variable relationships and the study's hypothesis.
- **Regression Analysis** is used to confirm if the causal or independent variables (X) have a statistically significant impact with the response or dependent variable (Y). It is used to test the hypothesis of this study.

- **One-Way Anova or Analysis of Variance Test** is used to investigate the means of more than one independent group to ascertain if a significant difference in the means being compared exists. One-Way Anova is used in this study to investigate if a single dependent variable differs among independent variable groups larger than 2.
- **Pairwise T-Test** is used to determine the difference between two variables. It is used in this study to pairwise compare Internal Control Effectiveness of two groups, given the three exposures to working arrangement, to determine the difference between the categories in these groups.

3.5 Validating the Questionnaire

A validation check is a technique for determining if the data aims to gauge what is anticipated. After studying a wide range of already published literature, the online questionnaire was created. A competent professional reviewed the questionnaire once it had been designed to ensure its validity.

4 Results and Evaluation

This study investigated several pieces of research on internal controls and factors that reduce or increase the effectiveness of internal controls. This section summarizes the analysis and assessment of the information gathered from respondents who provided feedback regarding the effectiveness of their organizations' internal controls. For statistical significance, the alpha value of 0.05 is used as the threshold.

4.1 Descriptive Statistics

The study includes 48.31% females and 51.69% males, revealing a nearly equivalent gender distribution as indicated in table 1. Table 2 and 3 indicate that all respondents are based in Ireland and are employed in the Irish financial industry. According to Table 4, respondents aged 25-34 make up most of the report (62.92%), followed by respondents aged 35-44 (31.46%), while only 3 and 2 respondents aged 45-54 and 18-24 participated in the survey, respectively.

Respondents Demographic

Table 1: Gender			Table 2: Ireland Based		
	Frequency	Percentage		Frequency	Percentage
Female	43	48.31%	Yes	89	100%
Male	46	51.69%	No	0	0

Table 3: Employed in Irish Financial Industry		
	Frequency	Percentage
Yes	89	100%
No	0	0

	Frequency	Percentage
18 - 24	2	2.25%
25 - 34	56	62.92%
35 - 44	28	31.46%
45 - 54	3	3.37
55 - 64	0	0

Majority of the respondents as shown in table 5 hold a bachelor’s degree as their educational background and in table 6, 48.31% of respondents have more than 5 years of experience working in their field, while only one respondent has an experience level below 1 year.

	Frequency	Percentage
High School Degree	0	0
Bachelor’s Degree	44	49.44%
Master’s Degree	13	14.61%
Doctorate Degree	8	8.99%
College credit, no degree	15	16.85%
Prefer not to say	9	10.11%

	Frequency	Percentage
Less than 1 year	1	1.12%
1 year – 2 years	0	0
2 + years – 3 years	10	11.24%
3 + years – 4 years	13	14.61%
4 + years – 5 years	22	24.72%
5 + years	43	48.31%

As shown in table 7, respondents with a hybrid work arrangement are 48.31%, while respondents with full-remote and onsite work arrangements are 24.72% and 26.97%.

	Frequency	Percentage
Fully Remote	22	24.72%
Hybrid	43	48.31%
On-site Office	24	26.97%
Other	0	0

	Frequency	Percentage
Accounting	13	14.61%
Banking	15	16.85%
Cryptocurrency/ Blockchain	10	11.24%
Data/Analytics	10	11.24%
Consulting	9	10.11%
Funding and Trading	4	4.49%
Insurance/Insurtech	7	7.87%
Payments	9	10.11%
Regtech/Compliance	8	8.99%
Savings/Investment	4	4.49%

Majority of the respondents who participated in the study as shown in table 8 are employed in Banking and Accounting organizations followed by Cryptocurrency and Analytic. Respondents employed in Investment and Trading organizations indicate the least response.

Mean and Standard Deviation

Metric scale variables relating to ICE were grouped by working arrangement to make comparisons between their summary statistics such as the mean and standard deviation scores. In Table 1 of the configuration manual, ICE in onsite work arrangements has a mean of 5.50 and is observed to be more effective in comparison to ICE in hybrid work arrangements with a mean of 5.19 and full-remote work arrangements with a mean of 5.18. Furthermore, the function of the audit committee in effectively performing their duty to monitor internal controls is highest in the onsite working arrangement with 5.96 as the mean in comparison to hybrid with a mean of 5.96 and remote work arrangements with a mean of 5.91. An employee's understanding of their obligations to manage their respective departments risk exposure and the responsibility of the department manager to explicitly communicate these risks have the highest overall mean of 6.00 in the onsite work environment while hybrid work arrangements report a mean of 5.79 for personal understanding and 5.72 for explicit communication from the department manager. Remote work arrangement reports the lowest mean in the category with a mean of 5.23 for personal understanding and 5.41 for explicit communication from the manager. The lowest overall mean is also attributed to the remote work arrangement with a mean of 4.41 and 4.66 under both categories of fraud training effectiveness in reducing occupational fraud and wrong behavior since the COVID-19 pandemic. The 3 categories that report low means for the remote work arrangement all involve communication. It can be assumed that communication dependent controls tender to deteriorate in full-remote work environments.

4.2 Frequency Analysis

Frequency analysis was conducted to observe counts and percentages of alternative control activities across organizations in Irelands financial sector. Table 2 in the configuration manual indicates that out of the 89.89% of respondents that have an internal control framework in their respective organizations, 70.77% have experienced a case of occupational fraud since the COVID-19 pandemic and Banking organizations take up most workplace fraud cases regardless of also having the highest frequency for Internal Controls framework as shown in Table 3 of the configuration manual. Surprise audits and Segregation of duties in table of the configuration manual are seen to be more frequent in Accounting organizations, followed by Banking, Cryptocurrency and Analytics organizations. The impact of these alternative control activities on ICE are evaluated in subsequent chapters.

4.3 Shapiro-Wilk Test

The Shapiro-Wilk Test is used for detecting all deviations from normality in a data. The test was conducted in this study Before testing the hypothesis and conducting other tests, to determine if the data is normally distributed or not.

Table 9: Results of the Shapiro Wilk Test on Normality

	Statement	Shapiro Test W value	p-value
1	Existing fraud controls have been effective in managing occupational fraud since the start of the COVID-19 pandemic till date (Occupational Fraud Occurrence Since COVID)?	0.874	4.061e-07
2	Identification process effectively identifies internal risk your organization is exposed to (Identification Process).	0.850	4.926e-08
3	The audit committee effectively performs their duty to monitor internal controls (Audit Committee).	0.808	2.113e-09
4	Your department manager explicitly describes your departments obligation in managing its risk profile (Manager communication).	0.847	3.96e-08
5	You understand your obligation to manage the fraud risks that your department is exposed to (Own Responsibility Understanding).	0.863	1.451e-07
6	Whistleblowing process ensures the confidentiality of the employee who reports suspected fraud (Whistleblower Confidentiality).	0.867	2.121e-07
7	Fraud perpetrating employees are appropriately punished when caught in your organization (Fraudster Punishment).	0.830	1.052e-08
8	Communications with stakeholder groups are functioning effectively to combat occupational fraud in your organization (Stakeholder Communication).	0.783	4.19e-10
9	Occupational fraud has been prevented in your organization since the COVID-19 pandemic because of fraud awareness training (Fraud Training for Fraud Prevention).	0.891	2.003e-06
10	Fraud awareness training in your organization deters wrong behavior of employees (Fraud Training to Deter Wrong Behavior).	0.861	1.202e-07
11	Senior management treat internal controls very seriously	0.883	8.611e-07

Table 9 shows the result of the Shapiro wilk test. A low p-value in the Shapiro-Wilk test for normal distribution denotes rejection of the null hypothesis that the data is normally distributed. The variables are considered normal or follow a normal distribution if the p-value is above 0.05. The results from the Shapiro Wilk Test show all p-values to be below 0.05 meaning the variables do not follow a normal distribution.

4.4 Spearman Rank Correlation-Coefficient Test

For scales that are not normally distributed we examine a non-parametric test that is not subject to statistical preconditions. Spearman rank correlation test is conducted since the variables do not meet the assumption of normal distribution. The variables, however, does meet the assumptions for Spearman correlations to either have a monotonic relationship or have an ordinal level. It is used to evaluate the strength of a connection between internal control activities under the five COSO components of internal Control and ICE.

Table 10: Results of the Spearman Rank Correlation Test

	Statement	Spearman Test Rho value	p-value
1	Identification process effectively identifies internal risk your organization is exposed to (Identification Process).	0.469	3.528e-06
2	The audit committee effectively performs their duty to monitor internal controls (Audit Committee).	0.550	2.328e-08
3	Your department manager explicitly describes your departments obligation in managing its risk profile (Manager communication).	0.352	0.000692
4	You understand your obligation to manage the fraud risks that your department is exposed to (Own Responsibility Understanding).	0.410	6.35e-05
5	Whistleblowing process ensures the confidentiality of the employee who reports suspected fraud (Whistleblower Confidentiality).	0.447	1.122e-05
6	Fraud perpetrating employees are appropriately punished when caught in your organization (Fraudster Punishment).	0.480	9.455e-07
7	Communications with stakeholder groups are functioning effectively to combat occupational fraud in your organization (Stakeholder Communication).	0.194	0.06744
8	Occupational fraud has been prevented in your organization since the COVID-19 pandemic because of fraud awareness training (Fraud Training for Fraud Prevention).	0.566	7.028e-09
9	Fraud awareness training in your organization deters wrong behavior of employees (Fraud Training to Deter Wrong Behavior).	0.553	1.913e-08
10	Senior management treat internal controls very seriously (Senior Management Behavior).	0.500	6.024e-07

The strength of the correlation from the Spearman Rank Correlation test can be interpreted to either be very weak or very strong depending on the closeness of the rho value to -1 which indicates a strong negative correlation or +1 for a strong positive correlation and 0 for no association. If the p-value is greater than 0.05, the correlation between the variables is regarded as either negative or positive. The results of the test in Table 10 show all p-values to be below 0.05 indicating a positive correlation, however the strength of the correlation varies. For instance, communication among stakeholders reveals a very weak positive correlation to ICE, while the two categories of fraud training, the audit committee and senior management behavior show a moderate positive correlation to ICE.

4.5 Regression Analysis

The study further evaluated the same variables used for the spearman rank test through a regression analysis. The test was conducted to determine the significance level of commonly used internal control activities on ICE.

	Statement	Estimate	p-value	Significance
1	Identification process effectively identifies internal risk your organization is exposed to (Identification Process).	0.446	2.42e-05	***
2	The audit committee effectively performs their duty to monitor internal controls (Audit Committee).	0.842	8.63e-08	***
3	Your department manager explicitly describes your departments obligation in managing its risk profile (Manager communication).	0.3615	0.00643	**
4	You understand your obligation to manage the fraud risks that your department is exposed to (Own Responsibility Understanding).	0.497	0.00031	***
5	Whistleblowing process ensures the confidentiality of the employee who reports suspected fraud (Whistleblower Confidentiality).	0.382	5.46e-06	***
6	Fraud perpetrating employees are appropriately punished when caught in your organization (Fraudster Punishment).	0.477	9.08e-07	***
7	Communications with stakeholder groups are functioning effectively to combat occupational fraud in your organization (Stakeholder Communication).	0.301	0.0730	.
8	Occupational fraud has been prevented in your organization since the COVID-19 pandemic because of fraud awareness training (Fraud Training for Fraud Prevention).	0.537	1.13-09	***
9	Fraud awareness training in your organization deters wrong behavior of employees (Fraud Training to Deter Wrong Behavior).	0.481	1.44e-08	***
10	Senior management treat internal controls very seriously (Senior Management Behavior).	0.449	6.94e-06	***

Further tests on the commonly used internal control activities using regression analysis shows most activities to be highly significant except communication with stakeholders which is seen to be insignificant in table 11 since its p-value of 0.0730 is above the alpha value of 0.05. Not only does it have a very weak correlation to ICE, it also does not influence ICE. Similarly, communication from managers have a slightly lower level of significance to ICE in comparison to other activities.

4.7 One-Way ANOVA

One-way ANOVA is conducted in this study to evaluate the impact of alternative internal control activities on the effectiveness of internal controls. It is subsequently used afterwards to test the hypothesis of the study.

	Statement	p-value	Significance
1	Does your organization segregate duties across different departments (Segregation of Duties)?	0.453	Not significant

2	Is criminal history pre-screening conducted before employing a new staff in your organization (Criminal Pre-screening)?	0.538	Not significant
3	Is certification pre-screening conducted before employing a new staff in your organization (Certification Pre-screening)?	0.971	Not significant
4	Are surprise audits conducted in your organization? (Surprise Audits)	0.0653	Not significant
5	Does your organization whistleblowers (Whistleblower Reward)?	0.0784	Not significant
6	Is there a defined employee support program support program in your company (Employee Support)?	0.0425	*

From Table 12 we observe that employee support programs have a significant impact on ICE. However, all other alternative controls discussed in the study and suggested by other researchers are not significant and therefore have no impact on ICE.

	Hypothesis	p-value	Significance
1	There is no difference in ICE across full-remote, on-site and hybrid work arrangements.	0.526	Not significant

Table 13 shows the p-value to be above 0.05, thus the null hypothesis cannot be provisionally rejected. We further research using a pairwise post hoc test.

4.8 Pairwise Post-hoc Test

The post-hoc test was conducted in the study to evaluate the pairwise comparisons between the group means being treated. It was then used to analyze what significant differences exists between the group means.

		Group 1	Group 2	p-value	p-significance
1	Internal Control Effectiveness	Fully Remote	Hybrid	0.989	Not Significant
2	Internal Control Effectiveness	Fully Remote	On-site Office	0.355	Not Significant
3	Internal Control Effectiveness	Hybrid	On-site Office	0.291	Not significant

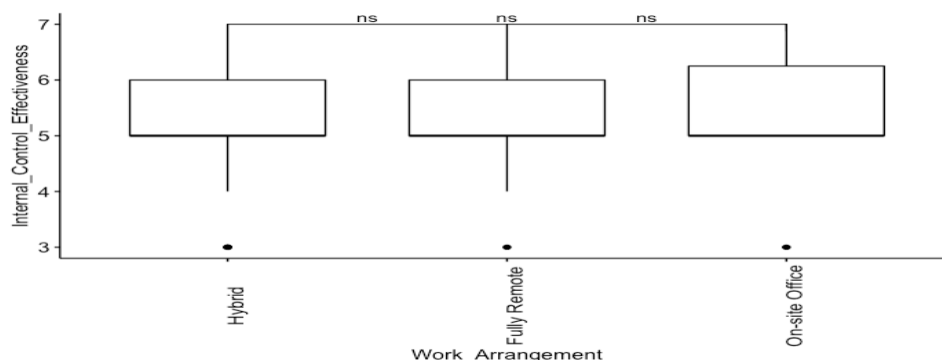


Fig 1. Pairwise comparison

In Table 14 and Fig 1. we observe that the three working arrangements; fully remote, hybrid and on-site office that were pairwise compared with internal control effectiveness reveals no significance. Thus, it can be concluded that there is no difference in internal control effectiveness across full-remote, on-site and hybrid work arrangements in Ireland's financial sector.

5. Discussions

The statistical tests used in the study were conducted to examine findings from other researchers regarding ICE, testing the studies hypothesis and answering the research question. The results reveal a strong proximity to previous findings on ICE but with new insights. The study was aimed at finding a difference in ICE across onsite, remote and hybrid work arrangements. Although no significance on ICE across all 3 working arrangements was found, the use, means and correlation of various internal controls to ICE vary largely across the 3 working arrangements. Communication dependent controls differs the most across work arrangement.

The correlation between a manager's ability to communicate internal control responsibilities to subordinates and the understanding of the employee to perform their internal control duties based on the communication received is very strong. This supports findings that video conferencing tools are inadequate in comparison to face-to-face communication. However, this control activity alongside the communication of internal controls with stakeholders have a relatively weak and insignificant impact on ICE. Similarly, of all the alternative internal control activities suggested by previous researchers and highlighted in the literature to boost internal control effectiveness, the study found only employee support programs to significantly impact ICE, nonetheless, most of these alternative controls; duty segregation, surprise audits, and employment pre-screening activities are still very largely adopted by some organizations in the financial sector, particularly banking and accounting. Through this study, organizations in the financial sector are likely to determine what commonly used and alternative controls to improve to deter workplace fraud.

6. Limitations

This study gathered primary data from responses of an online survey sent to senior level employees in Ireland's financial sector but was limited by time to gather equally distributed responses for each organization included in the study.

7. Conclusions and Future Work

This study was primarily focused on analyzing the effectiveness of internal controls in Ireland's financial sector using an online quantitative survey. The study evaluated internal controls between office-based and remote work arrangements to ascertain how effective current internal controls are in the increasingly hybrid work environment. Using a pairwise post hoc test, it is observed across the three working arrangements; full-remote, hybrid and fully on-site that internal control effectiveness reveals no significance. However, the use and relationship between various internal controls and internal control effectiveness vary largely across the 3 working arrangements.

The study evaluated the relationship between commonly used internal control activities designed by the Committee of Sponsoring Organizations of the Treadway Commission and internal control effectiveness and found that communication dependent controls not only

deteriorate in full remote working arrangements, but they also have a relatively weak impact on internal control effectiveness. Similarly, the study found that most alternative control activities suggested by previous studies to boost the effectiveness of internal controls have no significant impact on it, nonetheless these alternative internal control activities are largely used in banking organizations.

The study found banking organizations to have the highest occurrence of occupational fraud since the COVID-19 pandemic. Future research can be tailored to measure how internal controls perform across banking organizations in Ireland's financial industry.

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