

CASE STUDY

Internal Audit Process in eHealth: A Case-study

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Keywords: Telehealth; Internal Audit; Quality.

ABSTRACT

Background

Internal audit operates within international professional practices established by the Institute of Internal Auditors (IIA). It contains an independent role from the organizational structure and represents the third line of defense in the implemented model of government, risk management, and internal control. Internal audit provides reasonable safety regarding the quality of the processes, including reporting to management about internal control and risk management.

Objective

Internal control processes and risk management in the scope of the processing of calls and the charging of the outsourcing company. Formulate recommendations for performance improvement in the ambit of health policies.

Methods

For its fulfilment, this work was based on international norms for professional practice in Internal Audit. The risk management methodology – COSO ERM (Enterprise Risk Management – Integrating with Strategy and Performance) and COSO (Internal Control – Integrated Framework) were also used for the analysis of internal control.

Results

There were identified two risks of operational nature and internal origin, two risks of a strategic nature related to the market, and three risks of a technological nature.

Conclusions

The recommendations described in the report are based on the relationship between public and health policies that have gained importance in recent years with the Covid-19 pandemic, since the beginning of 2020, accelerating the digital transition process in Portugal. Contributing to outstanding dissemination of Teleconsultations, technological development and privileging paperless recipes, meeting the guidelines for EU Digitization by 2030.

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What is already known on this topic?

The European Commission sees eHealth as a priority and encourages the creation of a global strategy in the countries of the European Union, with the objective of developing the transformation, the Telehealth Contact Center sorting system has been optimized with the introduction of Artificial Intelligence in the branching of the algorithms and in the conclusion diagnosis.

Main contribution to Evidence-Based Practice

In the current context, with the growing tendency to health digitalization and the market potential in telehealth, the role of internal audit has been gaining an indispensable position in the success of a company, fomenting quality and rigor in decision making. In this way, internal audit is capable of significantly contributing to risk reduction and the improvement of management quality, converting itself into lucrative processes for the company.

Implications for healthcare practice

The relation between the diagnosed risks and the improvement recommendations allowed the correlation of internal policies with public health which sustains the sector.

Authors Statement:

All authors contributed equally to the development and writing of the article

INTRODUCTION

Internal Audit operates within international professional practices established by the Institute of Internal Auditors (IIA) and inside the guidelines established by the regulatory authorities. It contains an independent function from the organizational structure and represents the third line of defence in the implemented model of government, risk management, and internal control. Internal Audit provides reasonable safety over the quality of processes, including the report to management on internal control and risk management and management declarations about the effectiveness of internal control (International Federation of Accountants, 2018).

The global digital health strategy from the World Health Organization for 2020–2025 points toward digital health which should be an integral part of health priorities and benefit the people in an ethical, safe, trustworthy, equitable, and sustainable way. Furthermore, it must be developed with principles of transparency, accessibility, replicability, interoperability, privacy, safety, and confidentiality.

Objectives of this paper: Evaluate internal control and risk management processes in the scope of the processing of calls and the charging of the outsourcing company; Formulate recommendations to improve

performance in the sphere of health policies.

For this paper, the international norms for the professional practice of Internal Audit were used as a basis. The risk management methodology – COSO ERM (Enterprise Risk Management – Integrating with Strategy and Performance) and COSO (Internal Control – Integrated Framework) were also used for the analysis of internal control.

COSO ERM's implementation allows risk management to identify, manage and respond to risks effectively, since these risks cannot be eliminated, companies can implement COSO ERM as a strategic planning tool. (Ahmad et al., 2014; Society of Corporate Compliance and Ethics & Health Care Compliance Association, 2020).

The health sector is defined as a high-risk and high-complexity sector, with multiple interdependent dimensions (professional, technological, and organizational) which highlights the importance of risk management, even a low-risk event can have serious consequences that affect patients, staff, costs and the organization's reputation. (Kaya et al., 2019; Pascarella et al., 2021).

The COVID-19 pandemic has created for governments, managers, and professionals all over the world

unprecedented challenges emphasizing the limitations of analogue health systems. As a response, several containment and mitigation strategies were implemented for common development observed during the pandemic restoring trust in digital health. (Niakan Kalhori et al., 2021; Petracca et al., 2020).

Telehealth emerges in Portugal as an innovative and sustainable solution that contributes to the strategy of digital transformation through the principle of approximation of the citizen to Health via the resolution of geographical inequalities, improvement in the health care accessibility, and the guarantee of a more sustained and articulated between the different levels of care, contributing to greater efficacy and efficiency of the National Health System. (Serviços Partilhados Do Ministério Da Saúde & Centro Nacional de TeleSaúde, 2019).

Telehealth should help innovate the models of care provided outside the institutions, and Innovation should help strengthen the utility of telehealth as a means of support to the health care provision.

The case study presented here focuses on the inherent results from the Internal Audit in the management of a telehealth private sector company to evaluate the impact of internal audit on decision-making. Moreover, this will aim to understand which are the central areas whose impact is notorious and representative, following the contact centre's management circuit, up until the department of quality and billing.

Due to their confidentiality, the auditing processes cannot be included in this study, likewise, the informative details about the company's characteristics cannot be shared.

Risk Assessment Framework

Risk management arises as a process through which organizations methodically analyse the risks inherent to the process, intending to attain a sustained advantage, both in each activity and in the set of all activities. (Kaya et al., 2019; Pasarella et al., 2021; Society of Corporate Compliance and Ethics & Health Care Compliance Association, 2020)

The choice of the COSO ERM model was due to its great adaptation to all the sectors of business activity, its stages being easy to work with and fit in the institutional reality. Besides being much more than a mere inventory of risks of a business, it is ample and includes administration practices which the administration utilizes for active risk management, going far beyond the Internal Control System.

The Telehealth Contact Center Company in analysis possesses a risk culture where it is ruled by conduct defined by a deontological code, and all sectors of activity are incentivized to report incidents to contribute to an improvement of the organizational systems.

Quarterly, the company reports its main risks (existing and emergent) to the risk committee, which could potentially compromise the reach of the strategic objectives of the company – Key Risk Reporting.

The event identification methodology of an organization can employ a combination of techniques as support tools. Accordingly, an analysis of the process referent to the call processing in eHealth was executed through the flow chart, norm verification, invoice verification, call monitoring and examination of the risk management prevention plan, so that all the gathered information allowed for the accomplishment of the following steps in risk evaluation.

According to the COSO ERM (2017) model, by identifying events, the administration considers a variety of both internal and external factors which may give rise to risks and opportunities in the context of the entire organization. After an analysis of those factors and utilizing the companies' objectives and auditing scope as a base – processing of eHealth calls, the following areas were identified as most susceptible to generating risks:

• Human Resources Risk	▪ Turnover
• Operational Risk	▪ Failure in the process of call typification
• Market related Risk	▪ Insurance Subscription ▪ Seasonality
• Technological Risk	▪ Information Security Risk ▪ IT systems instability Risk ▪ Internet related Risk

risk,
each
risk will

be classified as low, medium, or high impact.

After the risk identification followed the evaluation in terms of probability of occurrence and impact, to determine how the risks should be managed.

For the qualitative evaluation of impact x probability and risks management map construction, the evaluation of probability is generally determined from past observable event data, which provide a more concrete base than entirely subjective estimates. However, the inexistence of past events by the entity led to the necessity of a probability analysis with recourse to sensibility criteria.

In what concerns the impact evaluation, materiality criteria, image and criticality were considered as determinants of the eHealth contact centre companies'

Each risk was then evaluated and portrayed in a risk matrix and was classified as high, moderate, or weak, the risk level was obtained for each event under analysis, thus being able to assess the priority of action by severity (Table 1).

After the risk analysis process, it was possible to ascertain measures, with the designation of those responsible, identify risks and prioritize action through preventive measures and mitigation mechanisms to manage risk, a graphical representation of identified risks was also elaborated, portrayed in Strategic Risk Map (Table 2).

Risk Matrix									
Probability	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9
0,90	Green			Yellow		Red			
0,80	Green		Yellow			Red			
0,70	Green		Yellow			Red			
0,60	Green		Yellow			Red			
0,50	Green		Yellow			Red			
0,40	Green		Yellow			Red			
0,30	Green		Yellow			Red			
0,20	Green		Yellow			Red			
0,10	Green		Yellow			Red			
Impact	0,10	0,20	0,30	0,40	0,50	0,60	0,70	0,80	0,90

Table 1: Risk Matrix

Table 2: Strategic risk map

Item	Category	Risk	Internal / External Risk	Prob.	Impact	% Risk	Level	Response	Procedures to adopt which prevent its occurrence	Types of Control	Responsible
R1	Human Resources	Turnover Risk	Internal	High	Low	20%	Moderate	Mitigate	Provide improvement in the contractual conditions and the policy of incentives, to bind service providers to the company; Provide better work conditions;	PT	Nursing Direction; Human Resources Department
R2	Operational	Failure in the process of call typification	Internal	High	Low	25%	Moderate	Mitigate	Invest in formation sessions to improve background performance in service and coaching and leadership formation sessions for the supervision. Recruitment of differentiated nursing to the sector; Upgrade service software to make the call typification automated. ICS Improvement	PT/DT	Quality council; Clinical Direction
R3	Related to the Market	Insurance subscription risks	External	Moderate	Very Low	5%	Weak	Accept	Invest information sessions to improve service background performance; IT services reinforcement during promotional campaigns	PT	Clinical Direction and Quality Council
R4	Related to the Market	Seasonality	External	Moderate	Very Low	5%	Weak	Accept	Invest in formation sessions to improve background service performance.	PT	Clinical Direction and Quality Council
R5	Technological	Information Safety Risk	Internal	low	Very Low	5%	Weak	Accept	Perform frequent robustness tests to the system; Guarantee legal compliance referent to General Regulation on Data Protection.	DT/CT	IT Coordinator; Quality Council
R6	Technological	IT Systems instability Risk	Internal	Moderate	Low	20%	Weak	Accept	Solutions/Services responses adjusted to the market demands; Information systems upgrade; Evaluate market alternatives; Robust infrastructure, fast networks, and appropriate hardware	CT	Clinical Direction; Quality Council; Fiscal Council; IT Coordinator
R7	Technological	Internet Related Risk	External	High	Low	20%	Moderate	Mitigate	Network coverage investment and upgrade for extraordinary situations of call flows; Optimize the sound quality and mitigate call abandonment	PT/CT	Clinical Direction; IT Coordination; Fiscal Council

Note: PT – Preventive Tests, DT – Detective Tests, CT – Corrective Tests, DT – Directive Tests

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Methods

The referred paper methodology was based on international norms for Professional Practice in Internal Audit.

The institution in study belongs to the private sector of Telehealth, it possesses multiple services on the side of the Nursing Triage line, 24h/7 days a week, 365 days/year, with teleconsultations support through on-call or online specialist doctors, pioneers of algorithm integration in Health triage with recourse to artificial intelligence.

The private sector insurance company is international, being represented in Portugal through a Holding SGPS, SA. It is present in various business branches, these being banking, life insurance, non-life insurance and

eHealth, this work was focused on the eHealth sector. To proceed to the execution of audit procedures it was necessary to comprehend the functioning of the recourse to Artificial Intelligence and call management in telehealth.

Through the analysis of the process of call management with recourse to Artificial Intelligence (AI), the following typification of call variables were identified: Artificial Intelligence (AI), General Health Information (GHI), and Medication information services (MIS) (Table 3).

The established materiality for this process consists of the estimated total value of 34 650,00€ to the defined time frame (1º quarter of 2021).

Article Code	Category	Price	Nº Calls	Cost	VAT	Invoice Value
0001M	IA	1,00 €	0001M 27900	27 900,00 €		
0002M	GHI	0,75 €	0002M 7200	5 400,00 €		
0003M	MIS	0,50 €	0003M 2700	1 350,00 €		
				34 650,00 €	23%	7 969,50 €

A statistical sampling was chosen when considering the characteristics of the population where the sample was extracted. The use of a stratified sample was deemed more appropriate, since it was verified that dividing

into distinct subpopulations with identified characteristics improves the efficiency of the audit, allowing for a smaller sample dimension without increasing audit risk (Table 4).

Statistical Method			
Stratified Sample	$p=0,05$	Confidence Interval 95%	
Call Typification			
IA	N=37.800	n=402	
GHI			
MIS	Checklist Compliance Test		
Invoicing			
IA	Estimated Value		Invoiced Amount
GHI	34.650	2%	35.375
MIS			

Table 3: Description of the statistical method

After collecting data in partnership with the financial and quality department, on average, 420 calls a day, and about 37 800 per quarter were verified, resulting in an N= 37 800.

A corrected sample was obtained with n= 402 where the n calculated for each stratum for call typification for

the defined time frame should be audited – 1^o quarter of 2021.

An analysis of billing in the defined time frame (1^o quarter of 2021) was performed, resulting in the analysis of 3 invoices (1 monthly) selecting the defined sample for each call typology (Table 5).

Typification of call	Monthly Invoicing	January			February		March		n
	Calls Made	Number of calls		n		Number of calls		n	
IA Emergency	1680	560	4	500	3	620	5	12	
IA Urgency	5220	1740	19	1740	16	1740	20	55	
IA Telemedicine	10500	3400	39	3500	37	3600	40	116	
IA visits	1800	600	7	500	5	700	7	19	
IA Telecare	10000	3335	32	3325	32	3340	32	96	
	29200							298	
GHI	7500	2600	26	2300	24	2600	26	76	
MIS	1100	370	10	360	8	370	10	28	
	37800							402	

Table 4: Billing analysis

Results

Activity and Internal Control

The Telehealth contact centre company interprets its control environment with a combination of the following factors:

- Management establishes conduct patterns and promotes risk and integrity culture through the fomentation of its deontological code.
- Management establishes structures, report lines, and responsibility levels to reach objectives.
- The allocation of internal control responsibility is applied in the whole organization.

The control activities are established through policies and procedures which help make sure guidelines given by management are executed. These helps guarantee that necessary actions are taken to confront risks in the achievement of company goals. (Richard M. Steinberg et al., 2007)

To get to know the Internal Control System objectives, the compliance with Internal control norm requisites of the Telehealth Contact Center Company, and the practices and proceedings of internal control inside the organization, it was necessary to elaborate a checklist of Internal Control.

The procedure for data collection was the elaboration of an internal control checklist, which consists of an investigation technique composed of several closed questions, with the goal of providing the auditor with a determined knowledge. (Schandl & Philip L. Foster, 2019)

The Internal Control System implemented in the Telehealth Contact Center Company, provides reasonable safety where the risks faced by its processes are under control. Albeit some improvement opportunities were identified and it is still possible to improve the efficiency of processes. Identifying specific controls which allow for more precisely measuring the

level of policy incorporation, regulations, and proceedings throughout the annual process of internal control evaluation.

Audit Test

The flowchart mapping was done to map the processes and identify the main steps and decisions in a workflow, with recourse to specific tools (map), where improvement opportunities may become evident through process analysis. To test the conformity of processing, we performed Compliance tests.

Once set the number of elements to analyze, the performance of the Compliance tests was put forward, with the selection of the totality of invoices (3) to the defined time frame and the analysis of the call typification process.

Thereafter, substantive tests were resorted to, which according to ISA 530 are audit proceedings designed to detect material distortions at the assertion level, which include detail tests and analytical substantive procedures. (International Federation of Accountants, 2018)

It was possible to verify that the deviation is in the sampling error interval defined for 5%, a deviation of $\approx 2\%$ was detected, for a confidence interval defined for the audit sample at 95%, the risk of material distortion which remains after the execution of the procedure is low (725,00€).

An audit of the call monitoring quality report was made, corresponding to the quarter in analysis to the non-standard typification verification correlating it with the data from financial analysis.

Before the unconformities are detected and analyzed in quality, it is determined that it is congruent with the existing deviation in invoicing. The corresponding deviation is found, as aforementioned, inside the defined standard error value, in this manner, management accepts the risk and implements preventive and detective measures.

Quality Audit

The quality audit of the Telehealth Contact Center followed the norms established by NP EN ISO 9001:2015 (Inspeção Geral das Actividades Culturais,

2015), in which the Internal Audit Team, after analysis of the service at audit and after having set an area/scope of the process capable of audit and establishing objectives, execute the verification list suited to the proceedings and processes.

An observational method was used, a simple descriptive and sampling with Random Call Monitoring. After the internal audit conducted on the Telehealth Contact Center, in the context of service and processing circuit of in-health contact centre calls, there were 6 unconformities observed out of which 2 correspond to a Human Resources nature risk; 2 to a risk nature Related to the Market; 1 with an Operational nature risk and 1 with a technological nature risk. (Table 2).

Internal Audit

The analysis carried out in the context of Internal Audit, presents as a result quality index is very satisfactory, without any critical risks; with a total of 6 unconformities, of which (1) in the category of human resources; (1) Operational; (1) Related to the Market; and (3) technological. With the necessity to implement preventive measures, for a moderate level of turnover risk (R1); preventive and detective measures for a moderate level of Failure in the process of call typification risk (R2); and implementation of preventive and corrective measures, for a moderate level of risk related to the internet (R7). It is proposed the implementation of preventive measures to the risks of Insurance Subscription (R3) and seasonality (R4); and detective and corrective measures for the risk of information security (R5), due to the low risk presented (Table 2).

Discussion

Quality Audit

In what confers to opportunities and improvement, 3 criteria were diagnosed with a level of moderate Human Resources and Technological risk. And one criterion to optimize with a low level of Operational risk. Hereupon, the Quality Audit Team recommends that the Telehealth Contact Center should as regards the Turnover Risk (R1) provide an improvement to the contractual conditions and the incentive policy to bind service providers to the company and invest in the formation sessions to improve background performance in service.

Coaching, Leadership formation sessions for differentiated nursing to the sector supervision and recruitment. Improve labor conditions, optimize natural light sources, or in its impossibility, LED illumination.

Regarding the Risk related to the Internet (R7), investments should be made to upgrade the internet network for extraordinary situations of call flow (ex: Public Health; Natural Catastrophes, etc.), to optimize sound quality and mitigate call abandonment.

For these improvement propositions, it is also recommended the scheduling of a calibration session within the next 3 months, underlying the Failure in typification of calls process risk (R2), to align audit criteria regarding the monitoring of calls between internal auditors and supervisor nurses, so that the standard deviation between both is within the 5%, as predicted.

Internal Audit

When evaluating the Internal Control System and its consistency, it appears that in view of the non-compliance with the risk of failure in the call typification process and with regard to the risk related to the internet, where the risk level is moderate, management from the top, in view of the implemented preventive, detective and corrective tests, will analyze the recommendations of the internal auditors. An important goal of application control is to avoid the possibility of system errors, beyond detecting and correcting those that are present. (Nsw, 2019; Saigí-Rubió et al., 2022)

The consolidation of human resources is recommended, through incentive and continuous formation policies to prevent turnover, and improve the professional's performance, reflected in the Key Performance Indicators (KPI) and Telephone Service Factor (TSF).

Investment in software upgrades to automatize call typification, preventing human error; and improving client data protection with its encryption after two minutes of no utilization. Investment in network coverage upgrade for extraordinary call flow situations; and to the support call recorder for quality ends, which supports exceptional volumes of contacts.

The Telehealth Contact Center Company exhibits strong internal control measures, a risk culture instituted within its collaborators, and a deontological code and error situation report in its platform.

It is the responsibility of top management to consider the response, after the evaluation of the risk effect and the occurrence and impact probability. It is also the Administration that "identifies the opportunities which may exist and obtains, therefore, a vision of the risks throughout the organization or portfolio, determining whether the general residual risks are compatible with the appetite for risk of the organization" (Society of Corporate Compliance and Ethics & Health Care Compliance Association, 2020).

Strictly speaking, the responsibility for the risk does not belong to the auditor, but to management, it is up to them the decision of risk acceptance, avoidance, mitigation, or transfer to insurance companies or service providers. Therefore, the evaluation of possible answers to risk depends exclusively on the administration council.

Conclusion

In the current context, with the growing tendency to health digitalization and the market potential in telehealth, the role of internal audit has been gaining an indispensable position in the success of a company, fomenting quality and rigor in decision making. In this way, internal audit is capable of significantly contributing to risk reduction and the improvement of management quality, converting itself into lucrative processes for the company.

The described recommendations in the report are based on the relationship between public and health policies which have been gaining traction in the last few years with the Covid-19 pandemic, since the beginning of 2020 accelerating the process of digital transition in Portugal. Contributing to an exponent disclosure of teleconsultations, technological development, and privileging no paper revenues, going towards the UE orientations for Digitalization for 2030. Although the theme appears recent, the World Health Organization, since 2012 has developed a manual on cybernetic health strategies and published the "Digital Health Strategies 2020-2025" in 2020.

(Medical Association, 2022; World Health Organization, 2021a)

The general Health policies which benefit the company operating area of the Telehealth Contact Center are:

- Integration, continuity, and Health care proximity;
- Continuous commitment to innovation, investigation, and development to generate, test, and implement new ideas and solutions;
- Promote and publicize the eHealth concept amongst citizens and professionals and sensitize them to its benefits;
- Pressure on public policies as a stakeholder of the National Health Service or as an influence in benchmarking analysis;
- Transfer power and Independence to the client through the development of Artificial Intelligence technology by creating user-friendly technology;
- Innovation is an integral and transversal part of the Strategic Development lines in Telehealth, one new idea may add value;
- Dematerialization of processes as a benefit to Telehealth in the environmentally sustainable policy.

The relation between the diagnosed risks and the improvement recommendations allowed the correlation of internal policies with public health which sustains the sector.

Before the response measures analysis of the diagnosed risks in the report, the Administration Council needs to develop a plan of implementation that establishes control activities and cost-effectiveness responses directed to risk. (Society of Corporate Compliance and Ethics & Health Care Compliance Association, 2020; World Health Organization, 2021b)

This work focused on the importance of Internal Audit in an eHealth private sector company's management

to evaluate the impact of internal audits in decision making and understand in which operational areas is the impact notorious and representative, following the contact centre's management circuit, up until the quality and billing department.

Limitations

This study permitted the application of the - COSO ERM (Enterprise Risk Management – Integrated Framework) risk management methodology in the eHealth sector highlighting the importance of cooperation between quality audit and internal audit in this sector of activity. However, this study describes our analysis based on the applied model, not possessing statistical relevance.

In future research, the impact of internal audit on corporate governance of Health organizations could be analyzed with a more representative and consistent data sample and in a broader study time frame.

Glossary

AC	Administrative Council
cT	Corrective Tests
DiT	Directive Tests
DT	Detective Tests
EU	União Europeia
GHI	General Health Information
IA	Inteligência Artificial
ICS	Internal Control System
IT	Information Technology
KPI	Key Performance Indicator
MIS	Medication information services
NHS	National Health Service
NP	Portuguese Standard
PT	Preventive Tests
TSF	Telefone Service Factor
WHO	World Health Organization

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