

A structured approach to integrating audits to create organisational efficiencies:

ISO 9001 and ISO 27001 audits

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Abstract

Although some articles have been written about integrated audits, they do not examine combining audits for ISO 9001 (quality management systems) and ISO 27001 (information security management systems). This topic is relevant across a wide spectrum of the Quality Management and research community, not to mention external auditors and staff with Operations and Information Technology (IT) responsibilities. Furthermore, it provides insights into the new version of PAS 99 (specification for integrated management systems). Quality Management practitioners may not be fully aware of the affordances of an integrated management system and combining internal audits. However, integrated audits make it possible to achieve efficiencies in the audit process whilst maintaining the benefits gained from audits such as process improvements. Clusters of research propositions were derived from a literature review comprising academic and professional sources and tested within a commercial organisation. The sample comprised internal auditors, auditees and external auditors. The findings and conclusions point to a reduction in audit effort, the number of audits and the audit resource required. A framework for establishing integrated audits is formulated.

Keywords: Auditing, Integrated audits, Integrated management systems, Internal audits, ISO 9001, ISO 27001, Management standards, PAS 99.

Introduction

“The defence company” employs approximately 600 people across three sites in the south of England; its business activities are the development and support of high-tech systems for land, sea and air in civil and military arenas. The defence company has had ISO 9001 (quality management

system, QMS) certification since 1995; the scope of registration covers requirements capture, design, development, integration, test and service provision. The three sites are covered by the same ISO 9001 certificate. In addition, non-defence projects have ISO 27001 (information security management system) certification.

One of the purposes of conducting internal management system audits is to assess compliance with the management system as a means of continuous improvement. An analysis of quality tools and their positive impact on the business included internal audits as a means of “reviewing current conditions” (Spasojević Brkić et al., 2013, p. 612). If an organisation has more than one management system, the internal audits could be combined as a means of optimising resources (Bernardo et al., 2010, p. 493; Jørgensen et al., 2006, cited by Casadesús et al., 2011, p. 74). Typically, the audit process involves: planning, conducting, report writing and following up any corrective or improvement actions needed (Gryna, Chua, & DeFeo, 2007, p. 526). Bernardo et al. (2009, p. 749) studied companies with multiple management systems. 87 per cent of the companies surveyed had integrated 86 per cent of their documentation and 96 per cent of their procedures. Of the integrated procedures, internal audits were listed among the most integrated at 97 per cent. In the defence company, audits focus on risk areas of both project-specific processes and general management system processes. Where there is overlap between ISO 9001 and ISO 27001, the same process area is audited twice by different auditors at different times during the year. After conducting an audit, the auditor writes an audit report, raises any corrective actions needed, links them to the appropriate management system standard requirements and tracks them to closure.

Due to the pressure from external stakeholders, organisations have adopted many different standards, implementing a separate management system for each one (López-Fresno, 2010, p. 629). The defence company was experiencing a growing demand for auditing against an increasing number of management system standards to meet stakeholders’ needs, with the same number of internal auditors. Initially, an ISO 9001 quality management system was implemented; later on, an ISO 27001 information security management system was implemented. In the future, stakeholders will almost certainly require additional standards to be adopted and the existing standards will be

updated (Rocha et al., 2007, p. 85). In fact, the defence company is already working towards achieving ISO 20000 (IT service management) certification.

Zeng et al. (2011) cite Karapetrovic & Jonker (2003) that to meet management system requirements, “each management system demands a lot of documentation, written procedures, checking, control forms and other paperwork” (p. 174). As each management system shares common requirements with other management systems those separate systems duplicate “procedures, checking, control forms and other paperwork” (Badreddine et al., 2009, p. 1742). Due to the increasing number of management system standards, the only way to benefit within this environment is to integrate them into a single integrated management system (IMS) (Asif et al., 2010, p. 648 cite Karapetrovic, 2008, Jørgensen et al., 2006 and Zutshi & Sohal, 2005; Singh, 2011, p. 1619). An effective IMS is essential in a competitive environment (Garengo & Biazzo, 2013, p. 310); more specifically, Martin et al. speak of, “security excellence [as] an extension of business excellence” (2011, p. 356).

An integrated management system is a set of interconnected processes that share the same resources and achieve stakeholders’ needs (Karapetrovic & Willborn, 1998 and Karapetrovic, 2003, cited by Bernardo et al., 2009, p. 743), and facilitates integrated audits (Chartered Quality Institute [CQI] IMSIG, 2007). Bernardo et al. (2009, p. 743) claim all management systems could be integrated into a single system and they mention ISO 9001 and ISO 27001 which are relevant for this research. In a case study organisation, the integration of management systems were found to be consolidated within a framework underpinned by Information Security Management and Social Accountability (Rebelo et al., 2013, p. 11). As a step towards an IMS, the defence company was interested in combining internal audits to achieve a reduction in audit effort for the activities covered by ISO 9001 (British Standards Institution [BSI], 2008) and ISO 27001 (BSI, 2013).

Research propositions

The overarching aim of this study was to establish a framework for integrating audits. A number of propositions were formulated from the literature review and they may be grouped into three clusters (Table 1).

Table 1. Research propositions.

Propositions clusters	Proposition	
Cluster 1: Anticipated efficiencies from integrating audits.	1	Integrating management system audits reduces auditing effort (Kraus & Grosskopf, 2008; López-Fresno, 2010; Simon et al., 2013)
	2	Integrating management system audits reduces audit costs (CQI IMSIG, 2007; Zeng et al., 2011)
	3	Integrating management system audits reduces paperwork (Casadesús et al., 2011).
Cluster 2: How to realise the efficiencies of integrated audits.	4	Management system audits may be integrated using the PAS 99 framework (Badreddine et al., 2009; BSI, 2008; BSI, 2012; BSI, 2013; Karapetrovic et al., 2010)
	5	Management system audits may be integrated by using the quality management system as a base and integrating other management systems into it (Bernardo et al., 2009; CQI, 2011; Griffith & Bhutto, 2009)
	6	Management system audits may be integrated using International Organization for Standardization integration guidelines (CQI, 2011; ISO, 2008; López-Fresno, 2010; Wang & Tsai, 2009)
	7	Management system audits may be integrated by combining the audit team, audit plans and audit documentation (Bernardo et al., 2010; Kraus & Grosskopf, 2008)
	8	IT-related management systems audits may be integrated using the protocols of the TickITplus scheme (Irving & Ross, 2009; JTISC, 2009).

Cluster 3: Obstacles/risks to achieving integrated audits.	9	Internal auditors not familiar with the requirements of the management system standards (BSI, 2013; Chaney & Kim, 2007; CQI IMSIG, 2007; Kraus & Grosskopf, 2008)
	10	Conflicting processes and documentation (Celik, 2009; Kraus & Grosskopf, 2008; Rocha et al., 2007; Zeng et al., 2011)
	11	The complexity of the management systems (Gryna et al., 2007; Kaziliūnas, 2008; Singh, 2011)
	12	Internal auditors avoid auditing information systems (BSI, 2013; Chaney & Kim, 2007).

Cluster 1: “Anticipated efficiencies from integrating audits”

Simon et al. (2013, p. 300) identify a benefit of integration to be task simplification. One of the principal benefits of an integrated management system is a reduction in duplicate processes, procedures and documentation (by removing duplicate activities performed by separate management systems). For example, both ISO 9001 (BSI, 2008) and ISO 14001 (BSI, 2004) have requirements concerning staff education and training. Casadesús et al. (2011, p. 75) cite a study by Brio et al. (2002) which showed that 90.3 per cent of respondents identified the most significant reason for combining ISO 9001 and ISO 14001 was the documentation that could be combined. Simon et al. (2013, p. 300) cite a study by Zutshi & Sohal (2005) which showed a reduction in the number, time and cost of auditing. The effort needed for audit planning and follow-up activities is also reduced (Kraus & Grosskopf, 2008, p. 10). In a survey of chemical and non-chemical companies, a key benefit of the integration of management systems was considered to be, “better use of internal and external audit results” (Simon et al., 2013, p. 300). All these aspects result in fewer audit days, thus saving time and costs.

Cluster 2: “How to realise the efficiencies of integrated audits”

In the field of management systems, the concept of Plan-Do-Check-Act (PDCA) is applied widely and it underpins various frameworks for management systems standards such as ISO 9001. Given the common principles of such standards, it is not unreasonable to seek resource efficiencies in operating those systems. PAS 99 (BSI, 2012) provides a framework for systems integration by identifying six areas of common requirements for each management system (Figure 1).

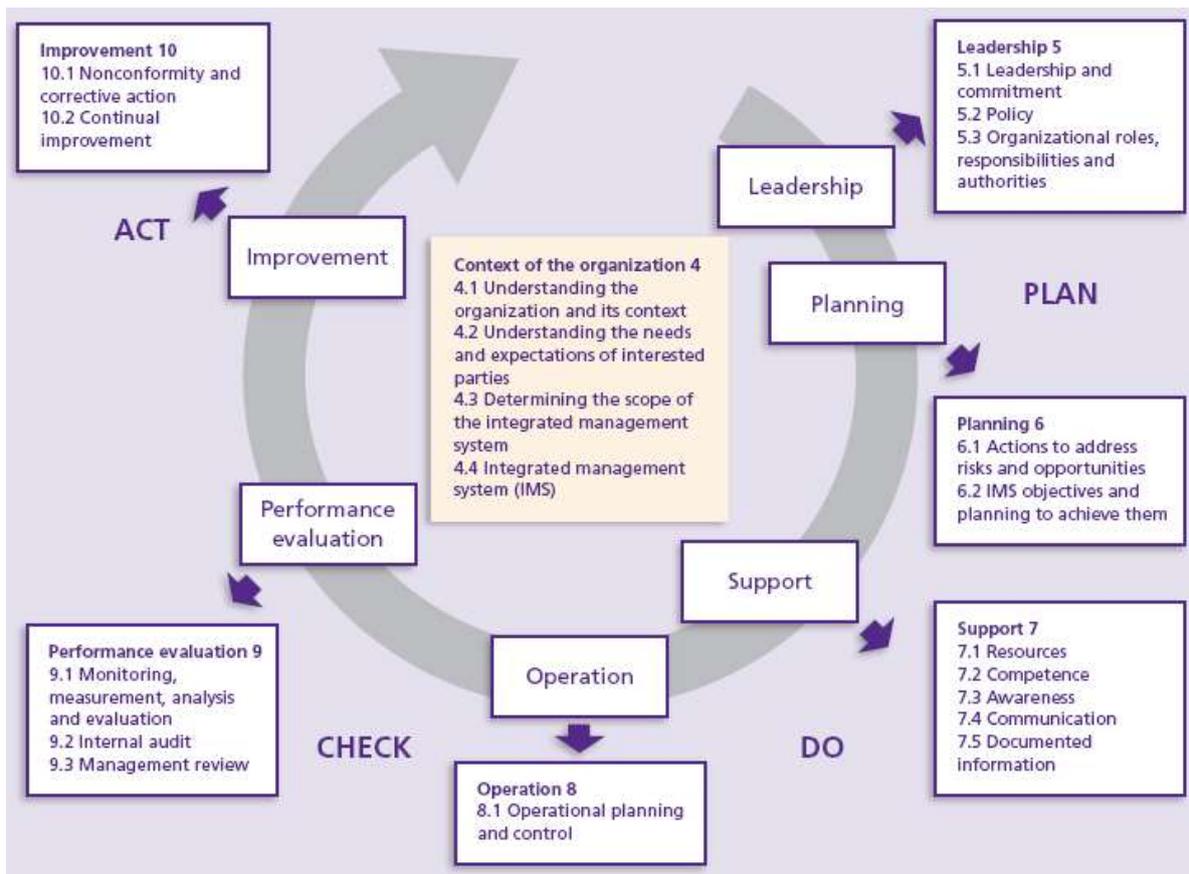


Figure 1. Framework of management system requirements (BSI, 2012, p. v).

Figure 1. Framework of management system requirements (BSI, 2012, p. v). Permission to reproduce extracts from PAS 99 is granted by BSI. British Standards can be obtained in PDF or hard copy formats from the BSI online shop: www.bsigroup.com/Shop or by contacting BSI Customer Services for hardcopies only: Tel: +44 (0)20 8996 9001, Email: cservices@bsigroup.com

In practice, many organisations already have well-established quality systems and that provides a stable base for merging management systems. That said, the approach to integration is different for every organisation and is influenced by aspects such as organisation culture, size of the organisation, process maturity and the management systems to be integrated (Karapetrovic, 2003, cited by López-Fresno, 2010, p. 632). For example, audits were retained as a key component in an organisation that initially structured its quality management system according to ISO 9001 but subsequently devised a structure based on PDCA and the Balanced Scorecard (Garengo & Biazzo,

2013, p. 328). The guidelines produced by ISO define a structured approach to integrating management systems (2008, p. 65). The approach is similar to PDCA - its stages involve planning, mapping the requirements of the standards onto the organisation's management system, identifying weaknesses and rectifying them. It also highlights the need for leadership of the integration cycle. ISO 9001 and ISO 27001 have common requirements as both are predicated on the PDCA cycle (Wang & Tsai, 2009, p. 265) and six common management system processes viz documentation, training, internal audit, management review, corrective action and preventive action (CQI, 2011). From a study of companies with ISO 9001 and ISO 14001 certification, Bernardo et al. (2010, p. 488) found different levels of audit integration: 47.1 per cent had fully integrated their audit processes and resources, i.e. audit schedule, audit team and audit reports; 36.8 per cent had fully integrated their audit process whilst 10.3 per cent had partially integrated their audit process.

It is a customer requirement for the defence company to have specialist certification for its software development and related activities. TickITplus[1] is an IT-specific certification scheme for ISO 9001 with options to integrate standards such as ISO 20000, ISO 27001 and ISO 25030 (BSI, 2007). The resources needed to set up and achieve TickITplus certification would have imposed a significant overhead on the defence company by way of training costs and the additional work needed to implement all the requirements of the various standards.

Cluster 3: "Obstacles/risks to achieving integrated audits"

Kraus and Grosskopf (2008, p. 10) identify the risk that quality practitioners in an organisation may not be sufficiently familiar with all management system standards to conduct integrated audits. There is a risk of poor audit methods and practices that do not achieve the expected improvements (Karapetrovic, 2002, cited by Asif et al., 2009, p. 265) and incorrect findings by auditors who are auditing beyond their understanding (Chaney & Kim, 2007, p. 50). A management systems auditor requires an understanding of all the management system standards within the purview of the integrated management system. The standard for auditing management systems (ISO 19011) was revised in 2011 to take account of developments in management systems and sector-specific

disciplines. Indeed, “auditor competence” is addressed at some length in that standard (BSI, 2011a, p. 24).

A risk with implementing an integrated management system is conflicting documentation and processes for the different system standards (Celik, 2009, p. 8152). Furthermore, the separate systems, resourced by different teams, may conflict (Zeng et al., 2011, p. 183); for example, the objectives and performance measures set for each system. ISO 27001 and ISO 9001 have different objectives concerning risk: ISO 27001 identifies threats, vulnerabilities and impact of confidentiality, integrity and availability for IS (information systems) assets whereas ISO 9001 encompasses *any* risks and the impact of any changes to planned activities. Thus, trade-offs are needed where conflicts exist (Rocha et al., 2007, p. 90).

Al-Darrab et al. (2013, p. 336) state that integration is needed as it is more complex to maintain separate management systems. It comes as no surprise that the complexity of the IMS will be increased as a greater number of management system standards are integrated although it would be anticipated that audits would help manage risk by taking an overview of the organisation’s activities in the round (Kaziliūnas, 2008, p. 67). However, issues concerning complexity should not be underestimated. Chaney & Kim (2007, p. 47) found that management system auditors avoid IT when conducting audits, leaving it to specialist IT auditors, even though IT is integral to the process being audited. Some controls audited by IT auditors include controls for maintenance and controls for managing access. Chaney & Kim identify this gap as a risk for integrated audits as business auditors are not testing the management controls that are in place. Business auditors believe auditing IT is not their job and that technology, because of its complexity, is outside the scope of their audit, whilst ISO 27001 requires that such controls be assessed to ensure they are effective. Chaney & Kim recommend that auditors have specialist training concerning the control of application development, controls for information systems and how to conduct investigations to determine the significance of impacts to enable them to audit those controls. Castillo-Rojas et al. (2012, p. 1083) identify difficulties in integrating management system standards; in particular the dimension of “Specialised support” includes the lack of auditors skilled in all standards comprising the IMS.

Research design and methods

A case study was used to examine the context of the defence company and collect data from multiple sources, viz questionnaires, semi-structured interviews and archival (documentation) research. On the one hand, this would show how organisations could potentially integrate ISO 9001 and ISO 27001 audits whilst, on the other, the efficiencies specific to the defence company could be investigated. The survey method was used to collect a large amount of data in a timely and economical manner. Each participant completed an identical survey allowing for comparison and the target survey groups were sent a questionnaire. This approach tested the propositions derived from the literature review.

Given the small numbers involved, it was feasible to survey the entire research population. The three groups and their response rates are shown in Table 2.

Table 2. Sample group and response rate.

Internal management system auditors: 9	88.9%
External (third party) auditors: 8	75.0%
Auditees audited during 2010: 58	62.9%

The questionnaire addressed the 12 research propositions; that gave rise to a mix of question types - some elicited information about the audit processes whilst others asked the participant to give individual rankings (1-5, low-high) to a set of statements. Some questions were reverse phrased to prevent the wording influencing responses. The semi-structured interviews were a mix of fixed-choice questions and qualitative questions. Participants were selected on the basis of their questionnaire responses; those with scale ratings of: 1 “very positive”, 3 “neutral” or 5 “very negative” were selected. The questionnaire and the interview framework were piloted by a small number of participants.

Minitab[®] (a statistics package) was used to analyse the data parameters; the Anderson-Darling normality test was applied to confirm the distributions were normal and the distribution characteristics (mean, standard deviation, etc) calculated. Minitab[®] produces distribution histograms and box plots of the data range showing the relationship between the quartiles and the

mean. The analysis of variance (ANOVA) test was used to make comparisons between the distributions. Where necessary, data that was not normally distributed was subjected to a Box-Cox transformation prior to ANOVA. Minitab[®] has the facility to optimise the value of lambda (the transformation parameter). The analysis process described above was performed for the parameters relating to each question topic in the survey. (For the sake of brevity, this paper presents only an illustrative subset of these outputs. However, the status of all the propositions is shown in Table 4.) A coding frame was devised to analyse qualitative data.

Results and discussion

Cluster 1: “Anticipated efficiencies from integrating audits”

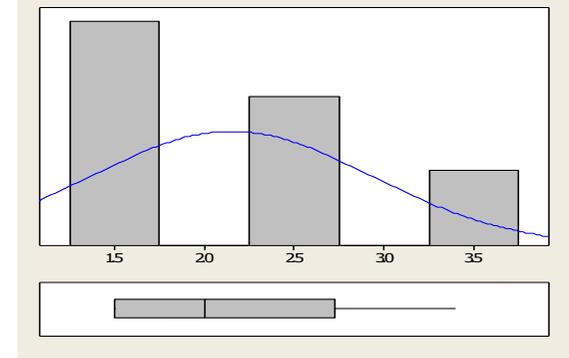
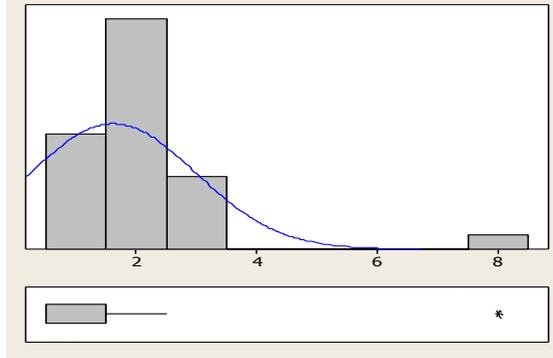
There are three propositions (reductions in paperwork, auditing effort and audit costs) in the cluster relating to anticipated efficiencies. One of the survey questions for auditees and internal auditors probed the number of hours taken, on average, to carry out an audit of a particular management system viz ISO 9001, ISO 9001 TickIT-related (TickIT provides guidance for certification of software-related activities; it has been replaced by TickITplus) or ISO 27001. Figure 2 shows this data set. Similar outputs were produced for the other propositions which, for brevity, are not included here.

Topic:
“Time taken to conduct
an audit”

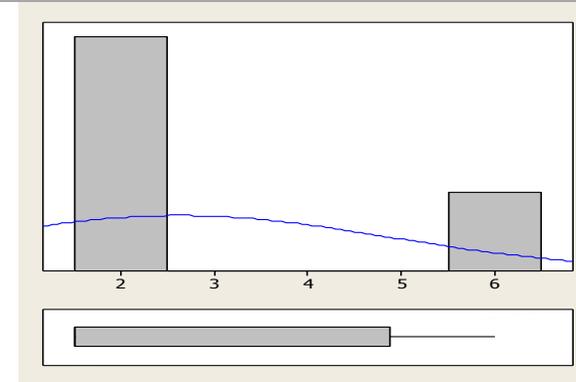
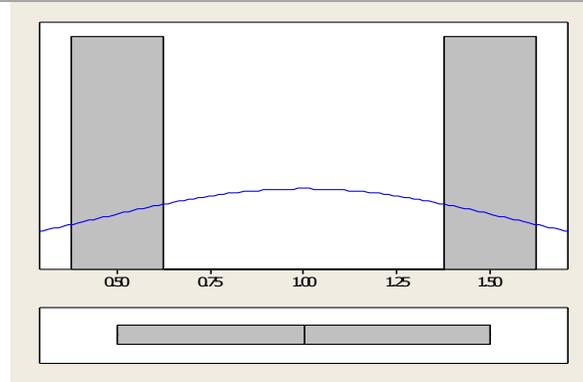
Auditees

Internal Auditors

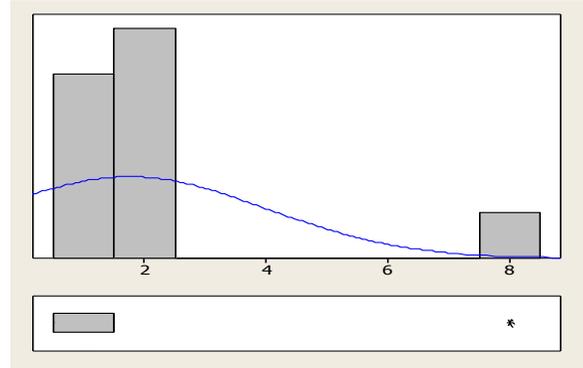
mtga
ISO 9001 audit



mtgb
ISO 9001 TickIT audit



mtgc
ISO 27001 audit



One data point only.

Figure 2. Example data plots from Minitab®.

The values of the parameters depicted in Figure 2 are shown in Table 3.

Table 3. Parameter values for “Time taken to conduct an audit”.

Parameter	Auditees	Internal Auditors
mtga ISO 9001 audit	normally distributed mean 1.62 hours SD 1.35 hours	not normally distributed median 1.50 to 3.08 hours (95% confidence interval)
mtgb ISO 9001 TickIT audit	normally distributed mean 1.00 hours SD 0.58 hours	normally distributed mean 2.63 hours SD 2.25 hours
mtgc ISO 27001 audit	normally distributed mean 1.75 hours SD 2.25 hours	not normally distributed only one data point mean 1.50 hours

The distributions were subjected to an ANOVA test to confirm there was no significant difference in the time taken to conduct audits. To enable this comparison, the data points for the internal auditors, mtga, were normalised by a Box-Cox transformation. Figure 3 shows the Minitab[®] optimisation of the transformation parameter lambda. The optimised lambda value was found to be -1.0, ie the transformed parameter mtgaT is the reciprocal of mtga.

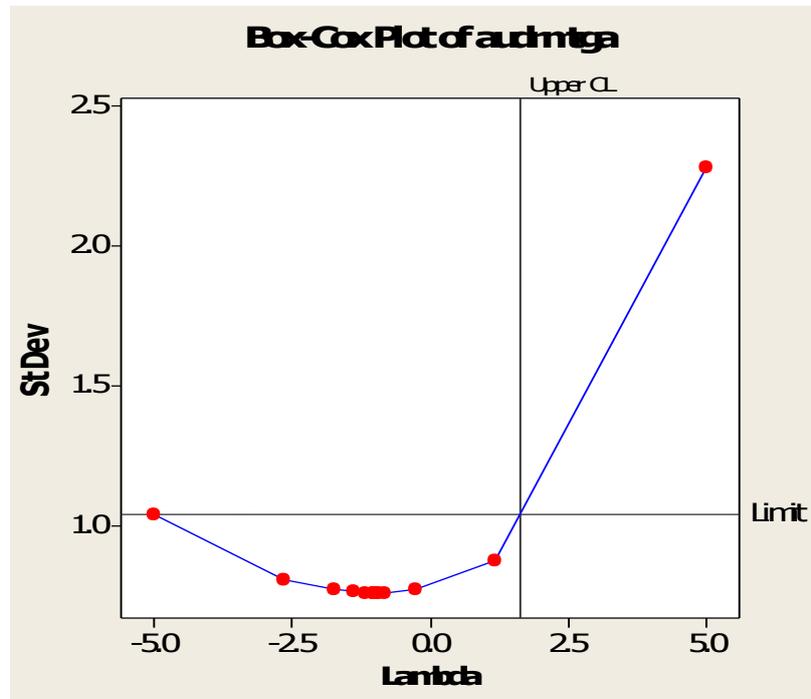


Figure 3. Optimisation of lambda value.

Figure 4 shows the result of the ANOVA test. (The parameter labels in the data set for the internal auditors are prefixed **audr** and those for the auditees are prefixed **aude**.)

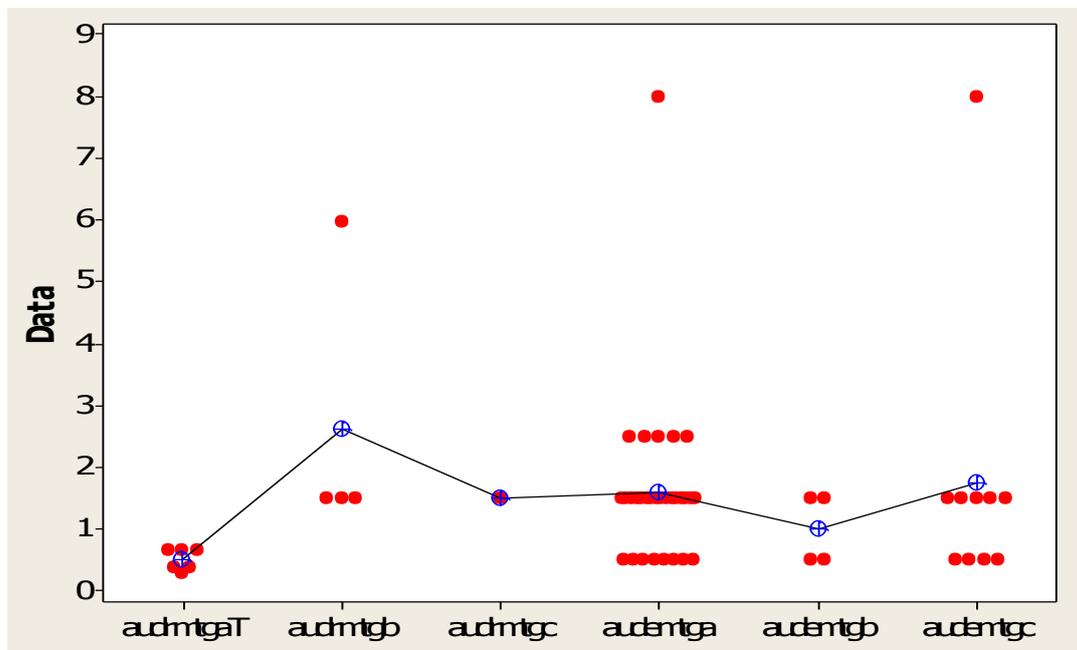


Figure 4. Result of ANOVA of the duration of audits.

Cluster 2: “How to realise the efficiencies of integrated audits”

The propositions in Cluster 2 (integrate audits using PAS 99; integrate audits using the QMS as a base; integrate audits using ISO integration guidelines; integrate audits by combining the audit team, audit plans and audit documentation; integrate audits using the TickITplus scheme) concern the use of established approaches to implement the changes needed to bring about the efficiencies.

Internal auditors were asked to rate the importance of nine business requirements for the audit lifecycle and activities. The requirements were based on the propositions in Cluster 2. Figure 5 shows the mean (indicated by the horizontal mark on each bar), the upper quartile and the lower quartile of each requirement.

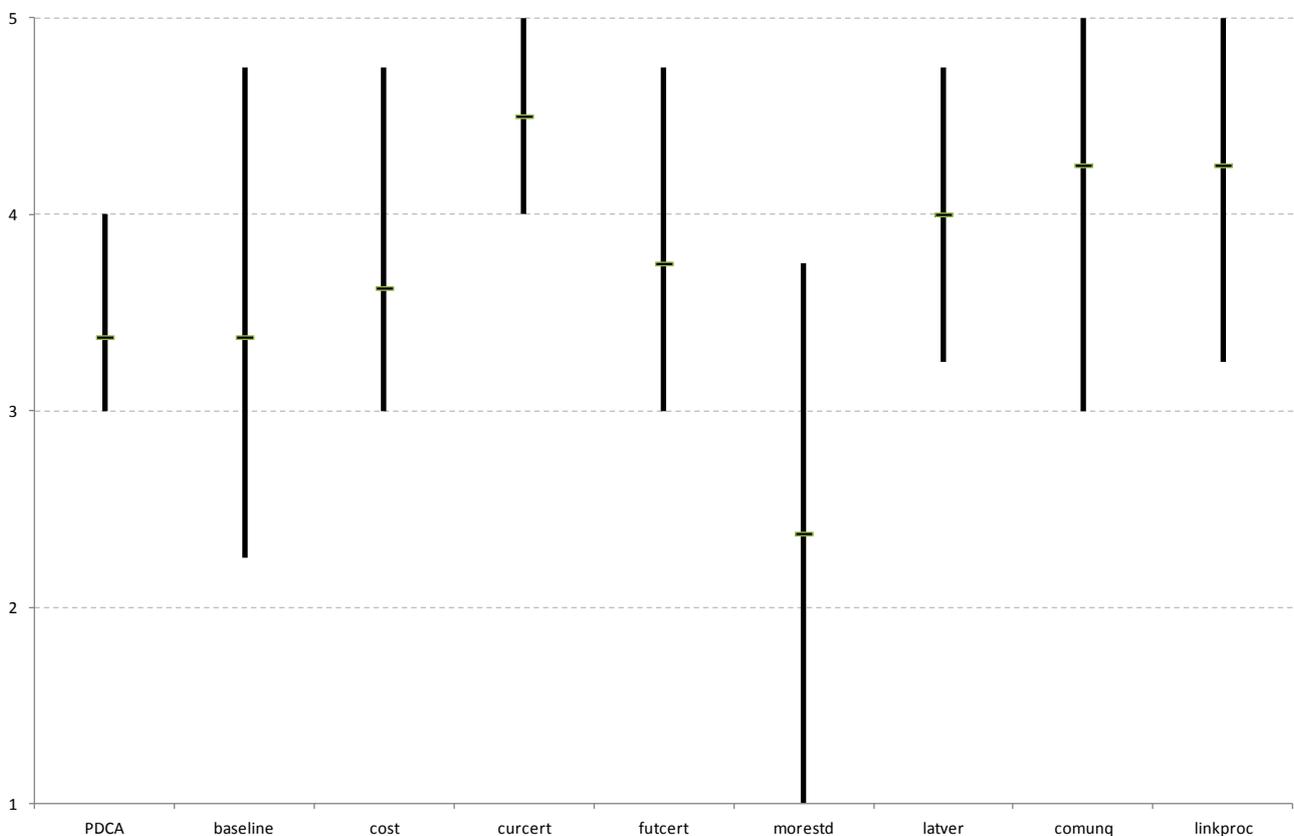


Figure 5. Importance rankings of business requirements.

Key to Figure 5.

Use ISO 9001 as a base and integrate other standards onto it	latver	Supports the latest version of ISO standards
Identifies common and unique requirements between standards	linkproc	Links ISO requirements to the defence company's processes
Minimal cost	morestd	Supports additional standards not currently in the business scope
Supports current certifications (ISO 9001 TickIT, ISO 27001)	PDCA	Use of PDCA - PAS 99
Supports future certifications (ISO 20000)		

Cluster 3: “Obstacles/risks to achieving integrated audits”

As well as investigating the benefits of combined audits, the research examined obstacles to achieving the anticipated benefits. Cluster 3 draws together four propositions concerning the complexity of management systems and the impact of this on the auditor.

The perceived risks of combined audits were that unique requirements might be missed if more focus was given to a particular system at the expense of others, lack of depth for the combined audits compared to separate audits, level of competence of the auditor regarding their experience with management system standards, a reduction in effectiveness due to a potential reduction in scope. The external auditors identified the risks of combining audits to be a lack of detail, overlooking some aspects of processes and insufficient time to conduct an in-depth audit following all audit trails. However, the proposition that internal auditors do not audit IT controls was rejected.

Concerning the risk of conflicting documentation and processes, the internal auditors who agreed there were conflicting requirements between ISO 9001 and ISO 27001 thought that auditors who had training in both standards would be able to identify the conflicting requirements and manage them accordingly.

The results for the propositions are shown in Table 4.

Table 4. Outcome of the research propositions.

Propositions clusters	Proposition		Result
Cluster 1: Anticipated efficiencies from integrating audits.	1	Integrating management system audits reduces auditing effort	Accept
	2	Integrating management system audits reduces audit costs	Accept
	3	Integrating management system audits reduces paperwork.	Accept
Cluster 2: How to realise the efficiencies of integrated	4	Management system audits may be integrated using the PAS 99 framework	Accept
	5	Management system audits may be integrated by	Accept

Propositions clusters	Proposition		Result
audits.		using the quality management system as a base and integrating other management systems into it	
	6	Management system audits may be integrated using International Organization for Standardization integration guidelines	Accept
	7	Management system audits may be integrated by combining the audit team, audit plans and audit documentation	Accept
	8	IT-related management systems audits may be integrated using the protocols of the TickITplus scheme.	Reject
Cluster 3: Obstacles/risks to achieving integrated audits.	9	Internal auditors not familiar with the requirements of the management system standards	Accept
	10	Conflicting processes and documentation	Accept
	11	The complexity of the management systems	Accept
	12	Internal auditors avoid auditing information systems.	Reject

Conclusion and recommendations for the Quality Management practitioner

Internal auditors and auditees perceived the benefits of combining ISO 9001 and ISO 27001 audits to be a reduced cost to the business, an increase in efficiency, less preparation time required for a combined audit, as it is necessary only once compared with twice for separate audits, less disruption (audited once rather than twice), avoidance of duplication, saving time where the scope of audits overlaps with corrective actions applied once to cover both management system standards. The external auditors identified the benefits of combining audits to be efficiency, avoiding repetition and disruption, the ability to probe/assess the interfaces between processes, having a clear holistic view of the management system and a simple process to assign findings to similar requirements at the

same time. For the “unique requirements” (BSI, 2012, p. 16), ie those that are not common, they should be included in audits whose scope is relevant to those particular requirements.

The research propositions can be translated into an audit integration framework which should bring about audit efficiencies and good auditing practice (Figure 6).

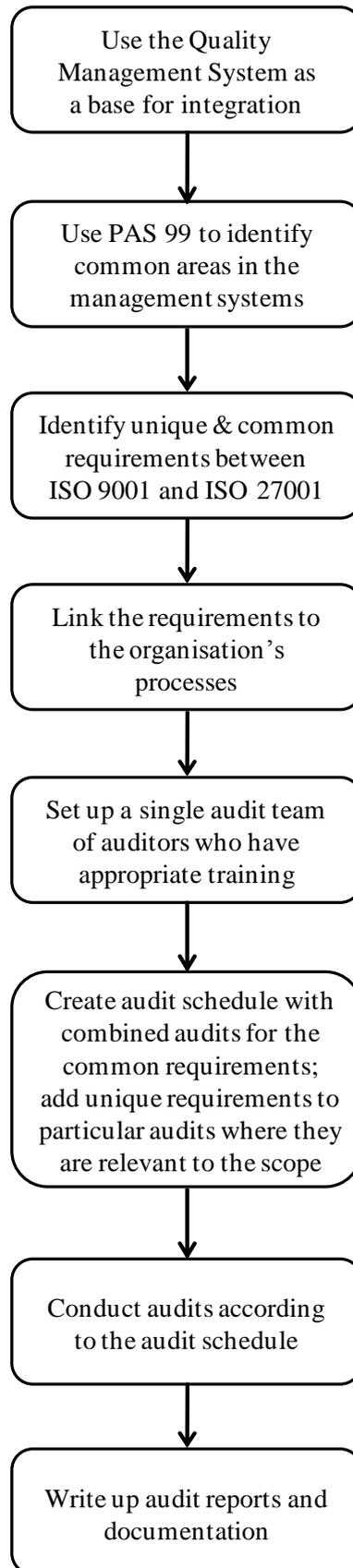


Figure 6. Audit integration framework.

For the Quality practitioner, this integration framework presents a structured approach for realising the benefits from integrating management system audits.

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Note

1. <http://www.ticketplus.org/information.aspx>

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