Teaching Risk Assessment In An Accounting Information Systems Course

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Abstract

This paper describes how a new assurance service, risk assessment, can be taught in the accounting information systems course. The new assurance services have been identified by the AICPA's Special Committee on Assurance Services as major sources of revenue and growth for CPAs. These new services require additional training for CPAs and require that academics incorporate such training into their curriculum. This paper reviews aspects related to offering risk assessment services including risk dimensions, the Committee of Sponsoring Organizations (hereafter, COSO) control framework, and the relevant knowledge. The paper also describes how these frameworks and knowledge can be taught in the accounting information systems class. This includes a discussion of 1) incorporating risk assessment into major learning objectives for accounting systems classes, 2) incorporating risk assessment into the revenue cycle, and 3) incorporating risk assessment in a popular systems project - the Systems Understanding Aid.

Introduction

Risk assessment has been identified as one of the assurance services of the immediate future. The Special Committee on Assurance Services (hereafter SCAS) noted that these future assurance services could be multibillion-dollar markets¹. This paper describes how to incorporate risk assessment skills into an accounting information systems class².

"Risk assessment" involves understanding a company's strategies and objectives and identifying the risks associated with those strategies. The business risks that companies face are defined as "the threat that an event or action will

adversely affect an organization's ability to achieve its business objectives and execute its strategies successfully" (Economist Intelligence Unit 1995, 2)³. As an extension of risk assessment a company may develop business controls and information systems to help ensure that the company meets its objectives. The information systems that are developed must be both financial and non-financial and must be designed with respect to the risks faced by an entity. The importance of risk assessment lies in enabling a company to discern whether it is "in-control" by focusing on what risks the company faces and then showing the company how to manage those risks.

Readers with comments or questions are encouraged to contact the authors via e-mail.

There are many recent examples that highlight the importance of risk assessment and business controls. Orange County's spectacular bankruptcy became more than just a derivative issue and has been considered a failure to disclose risks, a failure of management and board oversight and a failure to use "value at risk" models. Barings' derivative transactions and their inability to control the actions of a "rogue trader" contributed to the collapse of the billion-dollar bank⁴. There were major control breakdowns at Barings and a failure by the bank to understand the risks taken by Nicholas Leeson, the trader. Prudential's failure to control their sales practices has led to huge lawsuits and the possibility of losing their license to sell insurance in both Florida and California. Prudential sales employees were rewarded based on churning accounts (Treaster, 1997). Prudential failed to ask, "What risks do I face with my current sales practices and how do I establish controls over those risks?", and still further, "What information must my systems capture to enable me to manage this risk?"

Some companies are taking a proactive approach to managing risk. For example, one bank executive has noted that he considers changes in technology to be a major risk facing his business (see the related article in the Wall Street Journal by Deogun, 1996). He expressed concern that the changing technology could dramatically alter the banking industry. His solution? Consider buying the company that makes the software that impacts the bank's business. By buying the software company, he can control some of the risk. Other companies are actively identifying their risks. For example, ACT International has recognized customer satisfaction risk as a key to returning to profitability and Digital has improved its information available for decisions to help with product development and competitive risks (Economist Intelligence Unit 1995). Unlike the earlier examples given where companies are responding to major problems, these cases illustrate the importance of risk assessment in maintaining a company's competitive edge.

The remainder of this paper discusses the knowledge needed to teach risk assessment, the risk and COSO frameworks, the major goals in an AIS class, the integration of risk assessment into an AIS class, applying risk assessment to the Systems Understanding Aid, and finally a summary and conclusion.

Knowledge Needed

New Competencies

"New services may call for new competencies" (Elliott and Pallais 1997, 54). They note that many CPAs already have knowledge related to risk assessment but need additional training. This training is needed not only for practicing CPAs but for students as well. The SCAS identified numerous competencies necessary for the new assurance services. One group was labeled the "general competencies" and included a customer focus, a migration to higher valued-added information activities and information technology. The SCAS also stated that competencies are needed for each new assurance service (or specific competencies). The competencies identified for risk assessment assurance services include: 1) knowledge of the comprehensive risks that affect an organization, 2) knowledge of a company's mission, vision, objectives, and strategies and how they relate to its value chain, 3) knowledge of business planning activities and outputs, and 4) knowledge of new "relevant" measures. The SCAS adds that risk assessment and business performance measurement are closely related.

Risk Framework

It is clear from the necessary competencies enumerated above that to teach a course in this area requires a thorough understanding of risk. The specific competencies needed in this area must be developed so that students become skilled at understanding, identifying and assessing risks. Moreover, the numerous dimensions of risks must be made clear to students. The SCAS identified these dimensions as strategic

risk, operating environment risk, and information risk (see Table 1). The Economist Intelligence Unit offered risk dimensions of environment risk, process risk, and decision making risk. Both of these risk frameworks discuss in detail each of the numerous risks that businesses face. Each of these is a method for a company to view their risks and get control of those risks.

U.P.S.), the company faced an unidentified risk. Many companies are now doing business on the Internet. Yet how many have backup plans in case their Internet site gets attacked by hackers or simply goes down? The lesson here is that companies must think through all of their business processes to determine if any element of risk exists. Benchmarking can help in this area

Table 1

Classification of Risks according to the Special Committee on Assurance Services

Strategic Environment Risks	Threats from broad factors external to the business including changes in customers' tastes and preferences, creation of substitute products, or changes in the competitive environment, political arena, legal/regulatory rules, and capital availability.
Operating Environment Risks	Threats from ineffective or inefficient business processes for acquiring, transforming, and marketing goods and services, as well as loss of physical, financial, information, intellectual, or market-based (such as a customer base) assets, loss of markets or market opportunities, and loss of reputation.
Information Risks	Threats from the use of poor quality information for operational, financial, or strategic decision making within the business and providing misleading information provided to outsiders.

Once the dimensions of risk are established, risk identification must occur. Students can be taught to identify risks through numerous approaches. As previously mentioned, each objective set by a company runs the risk of not being achieved. Thus, focusing on a company's objectives can identify many risks. Specifically, companies can analyze each strategy and objective and ask questions such as, "What would happen to the business if a key supplier were not able to deliver their supplies on time?" Or, "If customer service is critical to the business, what are we doing to ensure that it is at its highest level?" and similarly, "Are we aware of the customer service levels of our competitors?"

Of course, if companies haven't set objectives in all areas, further unidentified risks can remain. The risk frameworks mentioned are helpful in identifying such risks. For example, how many companies had contingency plans to deal with the 1997 UPS strike? If a company hadn't first identified an objective of ensuring rapid delivery of their product, and then considered whether it had adequate alternatives in case the current delivery mode wasn't available (i.e.,

because it may show further exposures a company hasn't realized.

Another approach to identifying risk is to follow trends taking place in business. The trends can be problems other companies have faced or they can be broader regulatory and market trends. For example, if other businesses are getting into trouble over derivatives, what risks does your business face? Similarly, does your business monitor the risks related to the tactics used by the sales force⁵? Or, differently, what other products are being sold to consumers that are complex products that could someday cause consumer confusion as did Prudential insurance policies and sales tactics? If your company sells annuities, are they next? Does the brokerage industry face similar potential problems? Sales practice risks have just recently shown up in the long distance phone business, specifically the switching (by a sales consultant) of a customer's long distance carrier without the customer's permission (Keller 1998).

Regulatory trends and market changes can also help companies identify risks. Consider, for

example, the telecommunications market. If the market is shifting to digital, what are the risks faced by companies that do not offer digital transmissions? Additionally, companies that offer regular phone services or ISDN phone services should think about the impact of cable companies entering their market or the new lines being offered by AT&T and MCI that greatly increase Internet speed. Consider also the impact on banks of both virtual banking and of how many non-banking companies that are now offering banking services (e.g., funeral homes, insurance companies such as State Farm and grocery stores have entered the banking business to broaden their services to their customers). These cases all illustrate the importance of identifying strategic risks related to business trends.

COSO Framework

Many AIS texts have incorporated the COSO framework⁶. The COSO framework identifies 5 components: control environment, risk assessment, control activities, information and communication, and monitoring. The framework is illustrated in Table 2. The framework also identifies three areas of objectives: operations, financial reporting, and compliance. It is important to note that the framework links each of the components to the objectives. For example, for a company to meet its marketing objectives, the company should have a proper control environment, should have a risk assessment done, should have established control activities, should have the right information and communication systems in place, and should have monitoring of the entire process. The two keys here are the link between objectives and risk and the relationships to the other components. First, each objective that the company is striving to achieve has risks that threaten its achievement. Those risks must be identified, understood and managed through a portfolio of controls. Second, information systems must be developed to help ensure that the company manages the risks and simultaneously achieves its objectives. Herein lies the value for the AIS class. The COSO and risk frameworks highlight the need to link the ac-

counting systems to the company's goals, strategies and risks. Furthermore, identifying how well an accounting system ties in to goals and risks can help companies see the shortcomings of their systems⁷.

Teaching Risk Assessment within an AIS Course

Purpose of AIS Course

Borthick (1996) notes that there is agreement that the AIS course should teach proficiency with information systems and should discuss the roles of accountants as users, managers, designers, and evaluators of information systems. She identifies five learning objectives for the AIS course: information use, documentation, data modeling, systems development, and internal control. All of these objectives can be presented from a risk or COSO framework. Two of those objectives, information use and internal control, work especially well and are discussed in the next section. Teaching systems within these frameworks helps students to see that the systems are perhaps more important when they are designed to help a company meet its goals and manage its risks⁸. For example, one can approach teaching what information is relevant, or identifying business processes, from either the COSO framework or the risk frameworks. This allows the instructor to show the students why this business process is important to the company and what information the process must capture to enable the company to succeed.

Information Use as a Learning Objective

With respect to information use, Borthick (1996) notes that accounting students are not accustomed to deciding what information they will need to solve a problem because many have been taught from a "fixed-format reporting" framework. But how can students be taught to know what information they will need? One answer is offered by the risk and COSO frameworks: the information needed is the information related to the company's objectives and risks. The COSO

framework further suggests that once objectives and risks are identified, the company must consider the other COSO components. That is, they must now develop appropriate control activities and information and communication systems to help them achieve their objectives.

Table 2
COSO Framework

Cases and problems could be used that require the students to focus first on the strategies and objectives of a company and next on the risks that threaten such strategies. Just as the COSO model says information and communication systems should be tied to objectives, students should be taught the value of linking the information systems to the strategic goals. Two relevant cases that demonstrate this point are Harvard case studies on Mrs. Fields and Frito-Lay (although there are many more). For example, the Mrs. Fields case can be used to show how strategy led directly to a certain type of information system and to the capture of specific information to help the company achieve their strategy. Similarly, the Frito-Lay case can be used to show how relevant information needed to properly manage the company was not captured in the sales process.

By using the above approach, students can see what information is relevant. They soon learn that it is more than debits, credits and financial statements. Next, the students can be

asked to develop controls and information systems to match those strategies. Many students offer the usual segregation of duties, prenumbered documents, and cash receipts prelist. However, by focusing on what is important to the company they learn the significance of both accounting and non-accounting information.

Consider the following example of understanding the strategic importance of information. The example illustrates how the traditional accounting approach ignores the critical information that helps a company remain competitive. The typical acquisition cycle discussion focuses on recording, maintaining and reporting information in this area. However, the approach should be much more than this. A traditional AIS class might analyze the acquisition cycle and spend time on such issues as obtaining discounts or validating payments by matching liabilities to receiving reports and purchase orders. Missing discounts would be especially important in the case of a company that pays its bills late. However, failing to incorporate a risk assessment leaves something very important out of the picture for some companies. For example, consider the impact of paying bills late for a company like Aetna (see Wall Street Journal story by Anders and Scism, 1997). For Aetna, paying their bills late leads to inaccurate pricing of recently negotiated long-term medical contracts. If their strategy is to have the most competitive price, then the risk that exists is that those prices will not be competitively priced. This occurs, in their case, because the acquisition process is running slowly and information is not being passed along timely enough to allow for incorporation into new contracts. What can be emphasized here (and what opens the students' eyes) is how critical this issue is not just to the acquisition cycle, audit team, or accounts payable manager, but to the organization's goals and overall competitiveness. When this approach is taken students begin to feel the AIS course is taking on a consulting perspective.

Another example of using the information system to manage risks is offered by the

AICPA's continuing professional education course on Risk Assessment. Their course suggests studying a virtual corporation – in essence, a corporation that has out-sourced most of its major functions. The company can be studied to determine what risks arise by adopting this virtual approach. To manage its key risks, the company builds a relational database to help them capture information related to these risks. For example, the company identified risks related to their decision to contract outside drivers for the company's entire delivery system. Examples of such risks include how the driver interacts (and represents) the company when delivering and how well the driver delivers on-time. In order to monitor these risks, the company must capture non-financial information such as hours early/tardy from promised delivery date, shipping performance by shipper, freight costs by shipper, and product quality upon arrival. Because delivery and product quality are critical to this company's success, these types of information must be captured in addition to sales and cost of sales⁹.

Internal Control as a Learning Objective

Borthick (1996, page 82) notes that “accountants believe that internal control can provide reasonable assurance that systems will meet their objectives.” She adds that this view is often in conflict with information systems people because they focus on functional requirements (vs. internal control). However, these different approaches can easily be reconciled by viewing controls as something that must be built into the process to help determine whether strategies and objectives will be met. Consider the COSO and risk frameworks once again. The controls that should be built into any information system are the ones that relate to the strategies, objectives and risks that the company faces¹⁰. Recall that COSO breaks out objectives into three areas: operations, financial reporting, and compliance with laws and regulations (as illustrated in Table 2). Doing a “risk assessment” for a company requires an understanding of the strategies, objectives, and risks the company faces in each of

these three areas. Once this is understood, controls are built into the system to help ensure that the company meets its objectives and manages its risks. These controls are referred to as business controls rather than internal controls and take on a much broader meaning because they can refer to more than the traditional internal controls that accountants have historically used. Using this approach, it can be emphasized that any controls that exist are there because they are critical to meeting corporate strategies – and thus, they are necessary functional requirements that both IS and accounting professionals must consider¹¹.

The revenue cycle can be used to illustrate this point. Before teaching the systems part of this area, the strategies, objectives and risks should be discussed. Taking this approach helps the students to see the “value-added” of this area. The COSO framework states that the company should have objectives for both the “financial reporting” component and the “operations” component. In the revenue cycle, this means that some controls are designed to help with “financial reporting” objectives (e.g., prenumbered documents) and others are designed primarily to help with operating objectives of the company¹². For the risks related to “operation” objectives, COSO lists numerous examples such as: lack of inaccurate information regarding competitive products, not knowing whether the product is becoming obsolete, having a limited number of distributors, inadequate information on factors that influence marketing strategy, and incomplete or inaccurate information on customers. These types of risks and the business controls that must be built around them are very different from the traditional approach that teaches internal controls in the revenue cycle. This contrast is perhaps why the risk assessment area is tagged for high growth.

Coopers and Lybrand offers a case (Dermaceutics, Inc.) that could be used in this area¹³. It covers the marketing function instead of just the revenue cycle. The case includes handouts, a video and an Internet site. The case has students analyze the marketing function from a risk per-

spective (although it does lean more towards the auditing approach, it can be adapted to be more of a risk assessment case). One additional benefit of the case is that it offers a benchmarking assignment. In this assignment, the students use the Internet to access a database for use in benchmarking the company against the database and in comparing the company against "best practices" which are listed on the Internet site¹⁴. The SCAS noted that benchmarking is closely related to risk assessment¹⁵.

Once the concept of building controls into the system is tied back to strategies, objectives and risks, the students begin to change their perspectives on which controls are necessary in any given situation. Consider the following example. Upper Plains Auto Rental is a case that covers many areas including accounting system problems, general controls, and application controls (Phillips and Hopkins 1997). In the case, the issue arises over the rental clerk's ability to manually override the computer contracts on car rentals. The traditional answer is that this is bad internal control. However, the students should be challenged to consider this scenario within the risk and COSO frameworks. Is speed of service, or customer satisfaction a competitive advantage? Further, would allowing this override give the company that competitive advantage and enable it to be the leader or gain new business? If so, then perhaps the revenue system should allow this override because of its strategic importance¹⁶. Clearly, if allowed, other business controls need to be built in because of this new risk (the risk that the employee may not use the override properly). For example, new business controls could include tracking the number of overrides per employee, by type of customer, by amount and then monitoring this information. The answer may still be that this override should not be allowed, but forcing students to think through the strategic importance changes their perspective on controls.

Systems Understanding Aid

The Systems Understanding Aid (SUA) is

used frequently in undergraduate AIS courses (Arens and Ward 1995). Because of its widespread use, this section discusses how it might be taught from a risk or COSO framework.

Consider the revenue cycle at Warren, the company in the project. The students learn how Warren receives customer orders, approves credit, prepares an invoice, prepares a bill of lading, ships out items, receives cash, records cash and verifies if all cash was recorded. Using the risk and COSO frameworks, it can be shown that these controls are designed to ensure that the company meets its "financial reporting" objectives (COSO includes the assertions of completeness, existence, etc.)¹⁷. For example, the risk exists that all sales may not be recorded, that all returns may not be recorded, or that discounts on sales payments may not be recorded accurately. Students can learn the financial reporting issues and related controls very easily from this project. Using the COSO framework, students should be taught to consider the operation's objectives as well as the financial reporting objectives. They can be asked about Warren's strategies and the non-financial reporting risks Warren faces. Although there are many, possible strategies of Warren that students may identify include: quick delivery, product quality, cash flow, or low prices. Using this approach, students begin to gain a sense of what is important to Warren's business and how Warren might succeed or fail.

Once these goals, strategies and risks are identified, the students can be taught how to use the information system to capture the necessary information. The information that is important to capture is that which is important to Warren's strategies and risks that were identified. For example, if product quality is critical, it should be noted that Warren has a very weak system for capturing this information. The only information capture they have is when the goods are returned. In that scenario, Warren records some general comment about why the goods were returned. However, there is no coding scheme to ensure the valid reason for a return is known and

no mechanisms in place to pass along this information to management in a timely fashion.

If process time is identified as a key strategy and risk, the case can be used to identify how long it takes Warren to process an order. In this case, Warren receives a purchase order dated 12/16, prepares an invoice on 12/17, and then ships the goods out on 12/18. This scenario can be used to note the time it takes Warren to get the order out the door. Two to three days can be used as a discussion point – is it good or bad, and could it be better? It can be added that Warren currently does not capture this information and use it. Thus, Warren has no information about the strategy (and risk) of process time.

Students should be pressed to be sure they have identified all strategies and risks. They may not think of risks other than what they have been taught to see within the business processes and information system but it is important to enable them to think more broadly. A good risk framework established early in the course will help here. Two additional risks that could be identified here are risks related to the Internet and the manufacturer's goals.

Warren should consider the impact of the Internet. Bringing in this risk will help students see how business trends might affect their business. Will customers begin to order over the Internet or will they buy from sellers over the Internet? Warren must think about this risk because Warren could lose customers both ways. This risk can be related to the process risk mentioned above. Discussions can be focused on whether two to three days processing time seems reasonable given the Internet possibilities. Another risk Warren faces is the risk of the manufacturer's aspirations. In many distributing businesses, the manufacturer has the potential to sell directly, thus bypassing the distributors and putting Warren out of business. Customer relationships may then be the key to the business. Does Warren's current system capture any information on the Internet, the activities of the manufacturer, or the relationship with the customers?

The answer is no. Students (and Warren) are then confronted with a situation in which Warren faces risk and must therefore make a decision. Warren can do nothing and accept the risk, or alternatively, Warren can choose to capture information in their systems to measure these risks and help them achieve their goals. An analogy here can be drawn to major department store strategies in prior years. Drucker points out in his Wall Street Journal editorial (Drucker 1992) how department stores had about 30% of the market and ignored the remaining 70%. Not understanding the 70% led them to miss the more affluent market. Similarly, Warren must learn to think beyond company boundaries and to consider what other risks they face.

Conclusion

New assurance services have been identified by the SCAS as a key source of growth and revenue for CPAs. Risk assessment is one of these services. Major corporate failures over the last decade highlight the importance of this area and should help raise the perceived significance of this area. Risk assessment involves understanding strategies and risk, learning to identify risk and building controls to help a company manage that risk and thereby achieve their strategies. This paper has discussed the new competencies mentioned by the SCAS that CPAs and students must develop to work effectively in this area. The paper has also discussed the risk and COSO frameworks. Finally, this paper has shown how to incorporate risk assessment into an AIS course.

If AIS instructors have already incorporated some of these concepts as they discuss processes and value chains, the risk and COSO frameworks still have additional value in that they offer a framework in which to view risks and controls, as linked to strategies. Additionally, they offer a reminder that controls are not just the traditional internal controls but really include the much broader concept of business controls. Further, they offer a way to introduce each topic within the framework, to show why the area of

discussion is important and how it fits into the company's strategies. Finally, they offer a way to show AIS students how they can develop "risk assessment" skills.

By incorporating risk assessment into the AIS course, accountants get involved in many types of information and not just accounting information. Brecht and Martin (1996) commented that accountants need to use non-financial information in order to contribute better to managerial decision-making. Accounting students enjoy the adoption of risk assessment because it helps them see the value of their knowledge in financial accounting as well as in other areas.

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Footnotes

1. The full text of the SCAS's report on assurance services is available on the AICPA's Internet page at www.aicpa.org.
2. The curriculum changes discussed in this paper were developed with the help of a grant from the Coopers & Lybrand foundation. The purpose of the grant was to develop a course on business risks. This paper does not represent Coopers & Lybrand's approach but rather represents an attempt to begin to incorporate some of the new assurance services into the accounting curriculum.
3. The Economist Intelligence Unit is a member of the Economist Group and calls itself a specialist publisher.
4. Many stories have been written about the Orange County and Barings failures. For example, see Stevenson (1995) in the New York Times.
5. Both Sears and Prudential have had allegations in this area. Sears was alleged to have an incentive system that caused their sales force to overcharge customers. Prudential's sales system was alleged to en-

courage churning life insurance policies and to cause customers to misunderstand what transactions they were actually signing up for.

6. COSO refers to the Committee of Sponsoring Organizations of the Treadway Commission. In 1992, the committee published the document "Internal Control - Integrated Framework."
7. Focusing on the relationship between systems and goals is consistent with Brecht and Martin's (1996) comment that AIS courses need to expand to become both accounting and management information systems. Incorporating the risk and COSO frameworks can guide students in that expansion and at the same time help students to see the "relevance" of their decisions.
8. This approach does not require the instructor add numerous classes to an already packed semester. Instead, it requires the instructor approach each business process and system from a framework that discusses the value chain, the strategies, the objectives, the risks in that process (as well as other risks) and the related business controls.
9. The CPE course discusses many other risks related to this company. The company itself was discussed by Davis and Darling (1996).
10. The COSO document provides excellent examples of matching controls to objectives and risks in different business processes. It also provides illustrations of business models and the processes that are embedded within them.
11. In some cases, this leads to removing some traditional controls because the cost/benefits of the traditional control become more obvious.
12. The risk framework can be applied to any module, cycle or process of the company.
13. The case is available from Coopers and Lybrand. Access to the related Internet site requires a password that is supplied by Coopers & Lybrand to faculty and students.

14. Including more technology in the AIS course is certainly necessary. For example, Garceau and Bloom (1996) find what they call a paradoxical result in that the AIS course has a very low use of technology compared to other accounting courses.
15. Benchmarking has been defined as a process that "gathers data from external sources that highlight performance levels and, more importantly, identifies the practices that resulted in the superior performance" (Bolon and Weber 1995, page 2).
16. Some might consider this "empowering" the customer service representative.
17. Recall that COSO suggests a company set objectives in three areas: operations, financial reporting, and compliance with laws and regulations.
9. Drucker, P., "Be Data Literate - Know What to Know," *Wall Street Journal*, page A16, 12/01/92.
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16. Treaster, J. B., "Patching the Cracks in the Rock," *New York Times*, Section 3, 02/23/97.
17. Recall that COSO suggests a company set objectives in three areas: operations, financial reporting, and compliance with laws and regulations.