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Enterprise risk management: A systems-thinking framework for the event identification phase

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Abstract

Guidelines for developing and implementing a program of enterprise risk management have been developed by the Committee on Sponsoring Organizations of the Treadway Commission. One component of this risk management program is event identification, which involves developing a list of events that could affect the ability of the enterprise to meet its strategic and operating objectives. The guidelines establish objectives for event identification and suggest general procedures for identifying events that represent business risks. In this paper, I describe how systems-thinking could provide a framework to identify events that should be considered during risk assessment by (a) creating a map of the organization's value chain that specifies relationships among the atomic components of the business model, and (b) using a taxonomy of categories to analyze those relationships and identify events that could threaten business process performance.

Keywords: Business process risk; Enterprise risk management; Systems-thinking

A recent trend in corporate governance has been the development of an integrated, enterprise-wide approach to assessing the business risks that can impact an organization's ability to achieve its business objectives and to develop programs for managing those risks (Miccolis et al., 2001). Risk can be defined as the likelihood that the outcome from a process will not meet expectations (Knechel, 2002). Business risks represent threats to the ability of an enterprise to execute business processes effectively and to create customer value in accordance with strategic objectives (Bell et al., 1997). The rapid evolution of information technology has changed the processes that organizations use to create customer

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value and has spawned a new generation of business risks (Boulton et al., 2000). Many corporate executives believe that a comprehensive program for managing business risks provides an essential foundation for sustaining competitive advantage (Economist Intelligence Unit, 2001).

Business organizations across a variety of industries have begun to explore enterprise risk management as a paradigm for reducing earnings volatility and sustaining competitive advantage (Walker et al., 2002). To manage risk on an enterprise-wide basis, organizations must expand their focus beyond traditional concepts of risk to include economic and political factors along with risks related to reputation, ethics, and data integrity (Pricewaterhouse Coopers, 2002). Enterprise risk management involves anticipating and managing business risks before problems occur rather than responding and reacting to threats after the fact, when the damage has already been done (Barton et al., 2002).

In response to this expanding emphasis on preemptive enterprise risk management, the Committee of Sponsoring Organizations of the Treadway Commission (COSO) has developed a framework that describes key risk management principles and concepts, provides a common language, and offers direction and guidance. These guidelines build upon and extend the integrated framework for internal control developed by COSO a decade ago. The new COSO framework defines enterprise risk management as a process for identifying and managing potential events that could affect the entity's ability to manage business risks such that they remain within its risk appetite (COSO, 2004).

The COSO framework describes risk management as an ongoing, enterprise-wide process that involves eight interrelated components. To establish the foundation for effective enterprise risk management, the organization must create an (1) *internal environment* that fosters a commitment to competence, provides discipline, and articulates governance structures within the risk culture of the firm. With a sound foundation in place, management can evaluate their (2) *objective setting* procedures to be certain that, throughout the organization, business process performance objectives are linked to and support the strategic objectives of the enterprise.

Next, management must undertake an (3) *event identification* phase to develop or update a list of specific events that, if they occur, could influence business process performance. For each event, management performs a (4) *risk assessment* by evaluating the likelihood that the event will occur and estimating the probable impact of the event if it does occur. Then, management must select and implement an appropriate (5) *risk response* for all events, based on the risk appetite of the firm and the cost/benefit relationships for the various response options, and establish (6) *control activities* to help ensure that those risk responses are properly executed.

To manage this network of processes, the organization must establish channels for (7) *information and communication* that enable personnel to carry out their responsibilities and that provide management with feedback about the extent to which the organization is achieving its objectives. Finally, to govern the risk management process, the organization must establish a program for (8) *monitoring* how well each component is functioning and for tracking performance over time.

The COSO guidelines discuss how these eight components must be applied to different categories of organizational objectives (strategic, operations, reporting, and compliance) across all levels of the organization (entity-level, division, business unit, subsidiary). The

result is a three-dimensional matrix of enterprise risk management activities, which specifies how the (i) eight risk management components relate to the (ii) four entity performance objectives across the (iii) four potential organizational levels of a business enterprise. This paper focuses on one cell within that matrix. In particular, I describe a framework for *identifying events* that could influence whether a *business unit* will perform its *operations* effectively. The systems-thinking concepts that I apply to develop my framework could also be used to provide an alternative lens for evaluating other components of the COSO risk management matrix. However, to keep the discussion within manageable proportions, this paper focuses only on event identification with respect to business unit operating activities.

1. Event identification

During event identification, management identifies potential events that could affect an entity's ability to achieve its objectives. An event is an incident or occurrence that emanates from either internal or external sources. Events with a potentially negative impact represent risks, which require management assessment and response. Management initially considers a range of potential events without necessarily focusing on whether the potential impact is positive or negative (COSO, 2004). Event identification begins by analyzing the activities that an organization uses to execute its business processes. As Knechel (2002) explains, an effective process for analyzing events that impact business risk must identify how each process helps the organization achieve its business objectives, and describe the component activities that comprise the process.

The COSO guidelines provide a high-level discussion of various techniques that could be used for identifying events. However, while the guidelines provide examples of event-identification activities, they do not provide a detailed description of procedures that an organization could use to analyze business processes and to identify events that should be considered during risk assessment. Consistent with the stated objective of providing principles rather than establishing procedures, the COSO framework leaves choice of technique to the discretion of management.

In this paper, I present a technique for accomplishing the event identification phase of an enterprise risk management program. My approach is grounded in systems-thinking, a perspective that provides a holistic lens for viewing the interdependent systems of business processes that an organization uses to create customer value. Systems thinkers use a variety of techniques for analyzing a business model and understanding systems that create value (see Gharajedaghi, 1999 for descriptions and examples). I apply one of those techniques – systems modeling – to develop a framework for event identification. This paper describes how to model the value system for a business unit and how to use that model to identify events that could threaten the organization's ability to achieve its performance objectives. This approach provides a technique for evaluating business risks at the atomic level by identifying events that represent potential threats to business process performance.

A comprehensive technique for identifying events that threaten the operating performance of a business unit must account for risks that threaten all of the business processes. Evaluating threats at the business process level facilitates risk management in the context of where an organization is headed, not solely based on where it is today, and

provides the opportunity to manage risks as a portfolio (KPMG, 2001). A holistic, systems-thinking approach provides an effective foundation for evaluating business process risks because it illuminates the interdependent activities that drive a business model and that determine economic success (Bell et al., 1997).

2. The systems-thinking paradigm

Developing a holistic lens for evaluating business processes is known as "systems thinking" (Bell et al., 2002). Systems thinkers view organizations as complex networks of reinforcing and balancing processes that interact to drive performance (Kim, 1999). They focus on understanding the composition of the network – the overall system – before attempting to analyze the component parts (Ackoff, 1999). A holistic perspective for analyzing business processes fosters the view that each process must be understood in the context of its relationship to the people and organizations that execute the process, as well as its influence on other upstream and downstream activities (Haines, 2000).

Theories of systems-thinking evolved primarily from the early twentieth-century writings of American philosopher E. A. Singer, who provided a foundation for the systems approach to scientific inquiry (Churchman, 1968). Bertalanffy (1968) pioneered the development of a general systems theory that advanced a philosophy of science with a holistic focus. He explains that "*in the past, science tried to explain observable phenomena by reducing them to an interplay of elementary units investigable independently of each other … [but] problems of organization [are] not resolvable into local events … [because] systems [are] not understandable by investigation of their respective parts in isolation*" (Bertalanffy, 1968, 36–37).

Based on a similar philosophy, Ackoff and Emery (1972) extended the systems-thinking paradigm to create a framework for evaluating organizational performance. Their systems-thinking approach has been used to solve a variety of problems across a wide range of business contexts (See Ackoff, 1999 for a collection of writings that describe how systems-thinking has been used as a framework for organizational problem-solving). Although systems-thinking has been espoused somewhat sparingly in recent years (Bell et al., 2002, 17), the need to develop a more complete understanding of client business models has motivated a number of auditing firms to develop a holistic approach for assessing business risks (Lemon et al., 2000). In other words, auditors have begun to embrace the systems-thinking paradigm as a more effective means for understanding the risks that can threaten clients' abilities to sustain competitive advantage.

An essential skill in systems-thinking is the ability to develop a holistic mental model — an overall mental representation that provides a big-picture perspective (Gharajedaghi, 1999). A popular analogy describes the mental models that develop through system thinking as a perspective that focuses on the forest instead of the trees (Richmond, 2000). However, as Senge (1990, 127–28) explains, a more appropriate objective for evaluating business organizations is to develop the ability to see both the forest *and* the trees. A holistic focus helps problem solvers create mental models that make it possible to see through the complexities of a system and understand the underlying structures that make the system function as it does (Senge, 1990, 191–204).

Recent empirical research has demonstrated that mental models developed through the holistic lens of systems-thinking focus attention differently than mental models that are not developed through a holistic lens. For example, when individuals were asked to solve problems that involved dynamic, complex systems (e.g., optimal distribution of goods, explaining weather patterns, predicting traffic flow), expertise in analyzing complex systems influenced the focus of the mental models that they developed. Systems experts focused on how components of the problem linked together to form a holistic network with multiple causal relationships and decentralized control. On the other hand, systems novices focused on the influence of individual components with singular causal relationships that were influenced by centralized control. In other words, participants with significant experience in systems-thinking developed mental problem representations that focused on the emergent properties of a network of interrelated factors. Participants with little or no systems-thinking experience focused on aggregating the independent influence of the individual factors (Jacobson, 2001).

Behavioral auditing studies have demonstrated that differences in mental models produced by a holistic focus are associated with differences in decision making. For example, Choy and King (2005) found that novices who were provided with guidance for understanding the interactions among system components also (a) integrated decision information more effectively, (b) committed fewer inference errors, and (c) made more accurate decisions about the reliability of financial statements than novices who were not provided with guidance for developing a holistic perspective. O'Donnell et al. (2004) found that auditors who learned about client business activities through task structures that helped them better understand systems of business processes were more likely to integrate risk components into their overall risk assessment.

In summary, the central hypothesis of the systems paradigm is that developing a holistic perspective helps people to understand how interdependent components link together to determine overall performance. This holistic perspective provides a different appreciation for how the characteristics of individual components influence the behavior of the system as a whole. In other words, systems-thinking helps individuals to better understand both the behavior of the system in general and the influence of its component parts. As discussed above, research that examined individual behavior has provided empirical evidence supporting this hypothesis. I suggest that using the modeling technique developed by systems thinkers to provide a holistic perspective on an organization's value system could also help management develop a more complete understanding of organizational behavior. A more complete understanding should provide management with a better foundation for identifying events that should be considered during risk assessment. The next section describes how a systems model can be developed to describe the processes that drive a business model and to provide a comprehensive framework for identifying events that could threaten business process performance.

3. Applying systems-thinking

Using systems-thinking to develop a holistic perspective on a business model involves (a) identifying systems of activities that drive performance, then (b) developing a process

model that identifies the component relationships that drive each system (Gharajedaghi, 1999, 118–28). Business models describe how the pieces of a business fit together to form a system for creating customer value. Business models and the differences between them have been a popular topic in the business press for the past several years. However, while many executives can readily explain what their business does, they often have difficulty articulating exactly how their business model works because they fail to appreciate the nature of interactions among the network of processes that drive it (Magretta, 2002). In the same way that systems-thinking can help an individual develop a mental model that provides a more complete understanding of how the components of a system fit together, systems-thinking can be used as a framework for modeling business processes in a way that helps management develop a more complete perspective on their business model.

Gharajedaghi (1999, 109–117) describes how higher levels of understanding are achieved by holistic thinking. He suggests that understanding the *design* of a system provides a basis for understanding what makes the system perform the way it does. System design must be understood across three components: (1) the *structure* of system components and their relationship to each other, (2) the *function* of each component in terms of the outcome or results produced, and (3) the *process* or sequence of activities required to produce the outcomes. Because these components interact continuously, a holistic approach requires understanding each variable in relation to others in the set at any point in time.

Sterman (2000, 83–96) explains how modeling can articulate system design by organizing a group of functionally interrelated elements into a representation of the complex whole. Models that specify how the system is structured and the nature of interaction among components provide a basis for understanding patterns of behavior created by the system. Modeling involves (a) identifying key system components and determining how those components behave, (b) defining the structure of the system by mapping relationships among components, and (c) determining that the resulting model provides a faithful representation of how individual *processes* accomplish their *function* by interacting within the *structure* of the system. Applying systems-thinking to identify events that drive business performance begins by specifying the design of the business model in terms of interactions among component processes, that is, by modeling the structure of the processes and functions that the enterprise uses to create value (Haines, 2000).

Value creation processes have undergone significant change during the past decade (Kaplan and Norton, 2001). While the basic functions of business models have changed very little, the way that value is created has, in many business models, changed dramatically (Porter, 2001). Organizations whose business models adapted to these changes have prospered, but organizations that have failed to manage business risks effectively have seen their business models become outdated and have lost market share to more responsive competitors (Evans and Wurster, 2000). Because effective systems modeling involves constant iterations of reevaluation and refinement (Sterman, 2000, 87), process models of systems for creating customer value must be continually updated to reflect changes in the business environment.

In summary, applying systems-thinking as a tool for understanding a business model begins by modeling the business processes that create customer value. To be useful,

business process models must provide a faithful representation of the structure of the value system by providing a map of relations among business processes, and accounting for the output those processes generate. Because the business environment changes, business process models must continually be updated and revised. Using systems-thinking as a framework for analyzing a business model could be characterized as the process of mapping an organization's value system.

4. Mapping the value system

Business organizations create value through an interdependent system of business processes that transform the resources an organization acquires into the products and services that its customers want. In aggregate, the business processes that make up an organization's value system are commonly referred to as its "value chain." The economic prosperity of the organization depends on how well the business processes that drive a value chain can respond to customer demand. Value chains that respond effectively to evolving business and market conditions are the key to achieving and sustaining competitive advantage (Porter, 1996).

A value chain involves five primary activities that are enabled by a supporting infrastructure (Porter, 1985). Primary activities generally include (1) inbound logistics, (2) operations, (3) sales and marketing, (4) outbound logistics, and (5) customer service. The infrastructure that enables these primary activities must provide support for processing transactions and managing (a) information, (b) human resources, and (c) capital assets. Because the value chain puts an organization's business model into action, a map of the value chain provides a holistic view of the system of business processes that an organization uses to create customer value.

Value chain maps show the design of the organization's system for creating value by specifying interactions among related business processes. An organization earns an economic profit by using business processes to (1) acquire resources, (2) create value by adding utility, and then (3) deliver that value to customers. At the atomic level, business processes involve three components: the procedures embodied in the process itself, the resources that change as a result of the process, and the people and organizations who interact when procedures are performed (McCarthy, 1982).

Consistent with the systems-thinking framework described by Gharajedaghi (1999), a value chain map explains the *design* of a business model by describing how individual *processes* accomplish their *function* by interacting within the *structure* of the value system. As an example, consider how this systems-thinking approach could be used to map the value chain for a wholesale distributor. The value chain for this type of business model involves acquiring inventory (inbound logistics), warehousing and distributing that inventory (operations; outbound logistics), and selling that inventory to customers (marketing and sales; customer service). A value chain map that accounts for the processes, agents, and resources that make this business model work is presented in Fig. 1.

To acquire resources, employees of the firm must *anticipate demand*, so they can make decisions about how much and when to order, then employees must interact with suppliers to *order products*. To create value in the wholesale distribution industry, the firm must

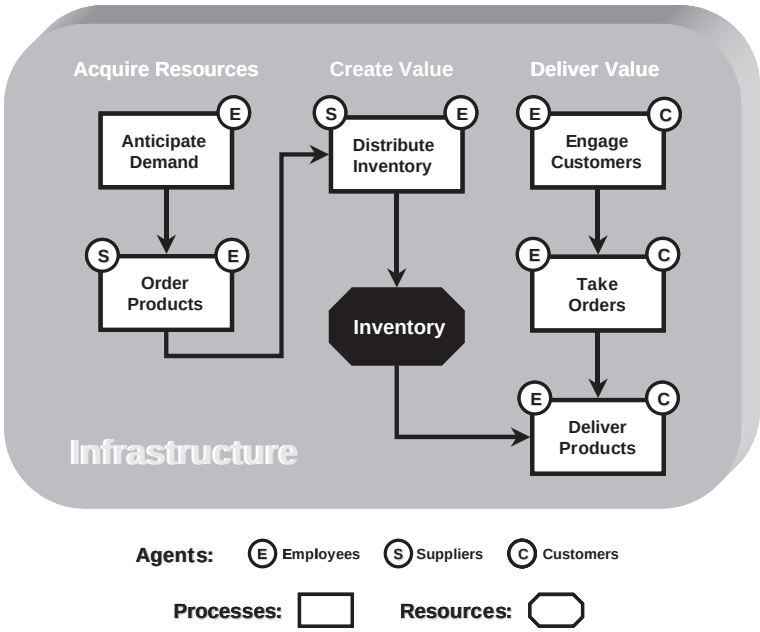

Fig. 1. Value chain map for a wholesale distribution company.

coordinate shipments from suppliers or make their own arrangements to *distribute inventory* to warehouses that are proximate to their market. The output from this series of interdependent procedures is a resource (inventory) that is in place and available for sale to customers. Performing the *order products* procedure effectively depends on accomplishing the *anticipate demand* procedure effectively. Likewise, *distributing inventory* effectively depends on performing the *order products* procedure effectively. All three procedures must be executed by employees of the firm and, in this example, two of those procedures also involve interacting with suppliers.

With the knowledge that inventory will be available when needed, the firm can begin its effort to deliver value. Employees must *engage customers*, which provides an opportunity to *take orders* from customers and to *deliver products* to customers. This series of interdependent procedures consumes the inventory that has been acquired. To *deliver products* effectively the firm must *take orders* effectively, which in turn requires that the firm *engage customers* effectively. In short, the value system for this firm involves three interdependent procedures for acquiring inventory and three interdependent procedures to generate revenue by selling that inventory.

As shown in Fig. 1, all of these primary value chain functions depend on an infrastructure of supporting activities. That infrastructure must process the transactions that occur when each procedure is executed, which includes functions like generating purchase orders, tracking inventory receipts, and making payments to suppliers. It must provide the information employees need to anticipate demand and engage customers effectively. The infrastructure must compensate employees and manage their benefits. It must also maintain physical assets and provide the infusion of capital as necessary. The infrastructure

must accomplish all of the secondary, behind-the-scenes activities needed to support the primary value-creating processes in the business model.

The model presented in Fig. 1 illustrates specific interactions among the primary, customer-facing business processes in the value chain. At a more detailed level, executing these primary processes requires support functions provided by back-office infrastructure. Systems-thinking can be used to create process models for these support activities as well. However, in the interest of parsimony, I have limited my discussion to the primary value chain activities.

In summary, Fig. 1 describes the business model for a wholesale distribution firm by illustrating how the atomic components of its business processes interact. Consistent with systems modeling prescriptions offered by Gharajedaghi (1999) and Sterman (2000), this value chain map describes the *design* of the system that the firm uses to provide value for its customers. The model provides a holistic illustration of the *structure* through which *processes* interact to execute the *functions* that the firm must accomplish to acquire resources, create value, and deliver that value to the market. Analyzing interdependencies among the procedures specified by the value chain map provides a framework for identifying events that must be considered when assessing risks that threaten this business model.

5. Identifying events

The enterprise risk management guidelines that COSO has proposed defines two objectives for the event identification process. One objective is to be thorough, that is, to focus on developing an exhaustive list of potential events. During event identification, management initially considers a range of potential events that could result from internal and external factors. Because events with a relatively remote possibility of occurrence should not be ignored, identification is best made apart from the assessment of the likelihood of the event occurring (COSO, 2004). The other objective is to recognize and account for interdependencies among events. Because events do not occur in isolation, management should understand how events interrelate. By assessing interrelationships, one can determine where risk management efforts are best directed (COSO, 2004).

Value chain maps provide a framework for identifying all of the events that could impact the business model by accounting for all business processes in the value system. Furthermore, because a value chain map documents the network of relations among the components that drive each business process (i.e., procedures, resources, and agents), it also accounts for interdependencies among events that can impact the value system.

COSO guidelines explain that it may be useful to group potential events into categories, which allows management to consider the completeness of its event identification efforts and reinforces a portfolio view of events at the entity level (COSO, 2004). Those guidelines suggest event categories organized around internal and external risk factors. For example, internal categories include infrastructure, personnel, process, and technology. External categories include economic, business, technological, environmental, political, and social. This taxonomy categorizes events by the type of business risk involved.

Systems-thinking dictates that categories for grouping events should be process-focused so that categories reflect the impact that an event has on related events in the value creation process. In other words, events that have the potential to impact value chain activities should be categorized by how the event would influence the organization's ability to perform business processes effectively.

Specifying systems-thinking categories begins by identifying the factors than can influence business process performance. For a business process to perform effectively, (a) component procedures must be capable of producing the desired results, and (b) agents must execute the procedures correctly. Both of these requirements are influenced by three factors. A procedure is not likely to produce the desired results unless the procedure: (1) was properly designed; (2) has adequate infrastructure support; and (3) is not constrained by factors outside of the organization's control. Agents are not likely to execute procedures correctly unless they: (1) possess the appropriate skills; (2) are adequately motivated; and (3) have the information they need to perform their task. These performance factors are summarized in Fig. 2.

Collectively, performance factors for procedures and performance factors for agents create a taxonomy of six systems-thinking categories for classifying events that could impact the value chain. For each category, events that could have either a positive or a negative impact on the corresponding performance factor should be considered. The type of events that should be considered is discussed by category below.

Procedure design — The procedures for accomplishing a business process represent a series of steps, each intended to achieve a specific result. The design of a procedure is essentially a recipe — if one of the ingredients is mis-specified, the recipe is not likely to create the expected result. For example, if the procedure for taking a customer order does not include checking product availability, then the procedure is not likely to perform properly because the customer will be dissatisfied if they do not find out that the delivery of an item will be delayed when they place their order. Events that impact

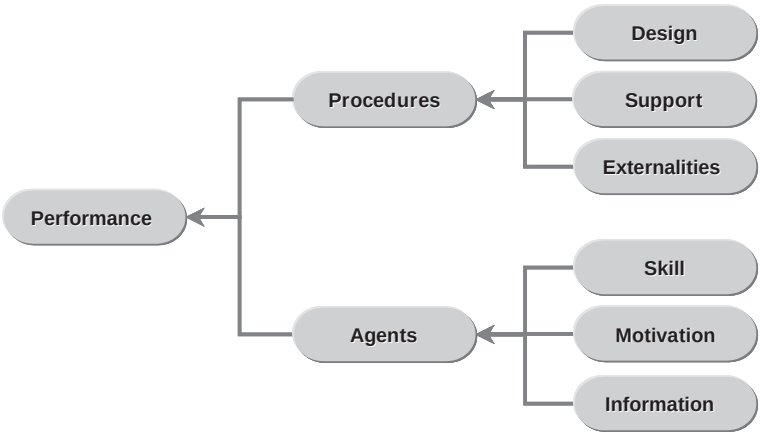

Fig. 2. Factors that influence business process performance.

the design of a procedure could involve failing to properly design the procedure when it was initially developed or as it is being re-engineered. Events that influence management's ability to monitor the performance of a procedure, so that they know when a procedure is not working properly, should also be considered.

Procedure support — All primary value chain processes depend on the support of an infrastructure that includes both tangible resources and services. In today's connected economy, placing a purchase order with a supplier very often requires information technology that can process and communicate the order. Many contemporary business processes depend on the availability of a communication infrastructure. For example, if a purchasing agent cannot log into their procurement portal because the network is down, then the procedure for placing an order cannot be executed effectively because that procedure has not been supported by essential infrastructure functions. Events in this category include all interactions among the target procedure and the infrastructure activities that support it.

Procedure externalities — External variables in the business environment pose risks from the impact of changing economic conditions, the level of competition in a particular market space, natural and man-made disasters, and political changes that influence regulatory control. These factors can have a direct influence of whether a procedure can be executed effectively. For example, marketing procedures for converting customer engagement into customer orders may not be effective because economic conditions have diminished the demand for the company's product. An organization can do little to influence environmental conditions. Managing environmental risks generally involves transferring risk through insurance, sharing risk through business alliances, or eliminating risk by withdrawing from a line of business that exceeds the organization's risk tolerance.

Agent skill — Agents cannot execute a procedure effectively if they do not know how. An employee who does not know the ins and outs of logistics management is less likely to make the proper arrangements for customer deliveries. A vendor who has not received explicit delivery instructions is also less likely to perform as expected. Management relies primarily on documented instructions to external agents and on supervision and training of internal agents to reduce risks associated with not knowing how to perform an event.

Agent motivation — People perform well when they have incentives to perform well. While those incentives may be both intrinsic or extrinsic, procedures are not likely to be executed effectively if agents are not motivated to perform well. Management reduces risk associated with motivation primarily through supervision and incentive programs for internal agents and contractual arrangements with external agents.

Agent information — Performance is less likely to meet expectations if agents do not have the information they need to make the correct decisions while they execute procedures. All procedures require a series of decisions, whether those decisions are embedded in a computerized application or require the judgment of an agent. For example, anticipating demand for company products requires a variety of information about sales trends, market saturation, customer demand, etc. If the information needed to execute a procedure is either not available or not reliable, an agent is not likely to perform effectively.

Note that these six systems-thinking event categories embody the internal and external business-risk categories suggested in the COSO guidelines. With regard to internal business risks, process-related events would be included under the procedures — design category, infrastructure- and technology-related events would be included under the procedures — support category, and personnel-related events would be included under the three agent categories. Events related to external business risks would be included under the procedures — externalities category.

6. Using the framework

The value chain map presented in Fig. 1 identifies the primary processes that drive the business model, the agents involved in each process, and the resource affected by those processes. Identifying events that threaten this business model involves analyzing conditions that could influence the six performance factors illustrated in Fig. 2 for each of the business processes illustrated in Fig. 1. For each process in the business model, management must identify performance threats (events) associated with (1) the design of, support for, and externalities related to all procedures required to accomplish the business process, and with (2) the skill, motivation, and adequacy of information available to the agents who perform each business process. In other words, each business process must be broken down into component procedures, and events that influence each of the six performance factors must be identified for all procedures.

Developing a comprehensive list of events that increase risks across a business model is obviously a substantial undertaking, one that requires a significant level of commitment across the entire organization (Barton et al., 2002). However, to illustrate how a systems-thinking framework for event identification would be operationalized in practice, I have developed an example for revenue cycle business processes at a grocery store that demonstrates how one business process performance factor (information available to agents) would be analyzed across the component procedures that accomplish each business process. The business model for this example is described in a strategic auditing case that was developed for Loblaws grocery stores (Greenwood and Salterio, 2002). Excerpts that explain the customer relationship management objectives that drive business strategy at Loblaws are presented in the Appendix. Information is a key performance factor at Loblaw's because their value creation strategy is to gather information about what their customers want from a grocery shopping experience and design business processes to deliver those shopping attributes.

Like most retailers, there are three primary business processes for the customer-facing activities that drive the revenue cycle at Loblaw's grocery stores: (1) engaging customers to create interest in specific products and get them into the store, (2) providing service to customers that enhance their shopping experience while they are in the store, and (3) transacting customers by selling products to them. These core business processes and the agents involved in each process are illustrated by the value chain map presented in Fig. 3.

Identifying events that prevent agents from having the information they need to make effective decisions when they interact with a business process involves analyzing the component procedures that drive the process. For each of the six agent–process

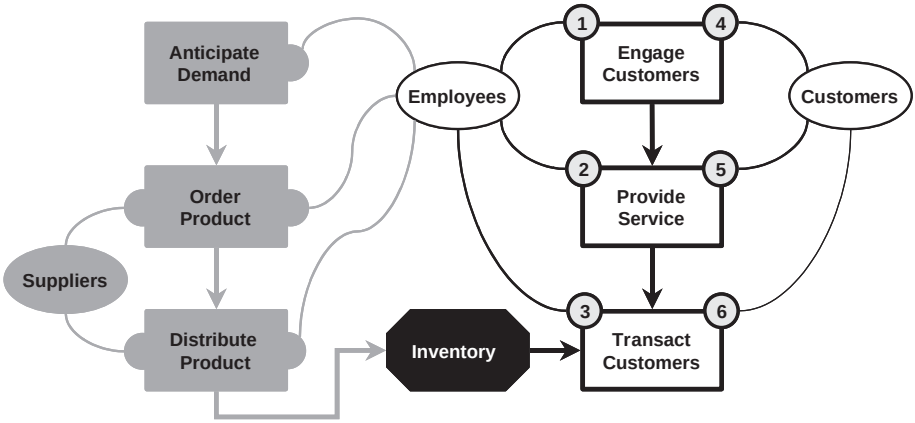

Fig. 3. Value chain map for a retailer grocer.

interactions identified in Fig. 3, management must (a) identify the component procedures involved in each process and (b) list events that could prevent the agent from having adequate or appropriate information. Table 1 provides an illustration of the events that management is likely to identify by analyzing the agent–process relationships specified in the value chain map from Fig. 3.

Table 1 lists only the events related to information available to agents that threaten business process performance for the revenue cycle. To develop the comprehensive listing of events prescribed by the COSO guidelines, management would have to perform a similar analysis for events that threaten other processes in the business model. Management would also have to analyze agent–process interactions for the procurement and revenue cycles to identify events that threaten the other two agent-related performance factors (skill and motivation). Furthermore, they would also have to analyze all processes to identify events that threaten component procedures with respect to design, support, and externalities.

7. Summary and conclusion

COSO guidelines for enterprise risk management describe an event identification framework organized around the different types of business risk that can threaten a business model. As an alternative, this paper describes a systems-thinking framework for identifying the various events that could hinder the ability of a business unit to achieve its operating objectives. By creating a value chain map of its business model, an organization can identify the business process components that must be analyzed to develop a comprehensive listing of events.

A value chain map helps the organization develop a holistic perspective on its business model by specifying the procedures and agents that drive each component process. Documenting the atomic components of the business model provides a framework for identifying events that could influence business process performance. The three

Table 1
Events that threaten information provided to agents involved in each business process

Component procedure	Events that threaten performance
(1) Engage customers — employees	
Identify customer groups to target	a. Target groups that do not want our products
	b. Target groups that cannot afford our products
	c. Target groups that are not willing to travel to our location
Gather and analyze customer data	d. Customer data is not available
	e. Do not have the tools to analyze data effectively
Anticipate customer preferences	f. Do not know what products customers want
	g. Do not know when customers are likely to buy a particular product
	h. Do not know how much customers are willing to pay for a product
Develop marketing initiatives	i. Initiatives are not deployed at the right time
	j. Initiatives do not promote profitable sales patterns
Deliver the message	k. Message does not reach the target market effectively
(2) Provide service — employees	
Identify services that customers want	a. Do not know what services to provide
Provide services in stores	b. Services are not available when customers want them
	c. Employees do not know procedures for delivering services effectively
	d. Employees do not have the product knowledge they need to deliver effective service
	e. Services do not complement and support marketing initiatives
(3) Transact customers — employees	
Price products	a. Product prices are not competitive
	b. Products are not priced at optimal margins
Manage inventory	c. Store layout is not optimal
	d. In-store promotions are not effective
	e. Product mix is not optimal
	f. Inventory levels are not optimal
Deliver checkout services	g. Sales data not captured effectively
	h. Do not have information needed to sell additional products effectively
	i. Do not have the information needed to service customers effectively
(4) Engage customers — customers	
Customers respond to the marketing message	a. Customer does not get the message
	b. Message does not capture the customer's attention
	c. Message does not contain effective information
	d. Message does not provide an effective incentive
(5) Provide service — customers	
Customer appreciates service initiatives	a. Customers do not know what services are available
	b. Customers do not want the services that are provided
	c. Service as delivered does not satisfy customer needs

Table 1 (*continued*)

Component procedure	Events that threaten performance
(6) Transact customers — customers	
Customer finds value in their shopping experience	a. Products are hard to locate in the store b. Product-specific information is difficult to locate or understand c. Check-out experience is not acceptable d. Products do not meet customer expectations

performance factors associated with procedures and the three performance factors associated with the agents who execute those procedures provide a taxonomy of six categories of events that must be considered.

Every business model is different and each organization must develop its own list of events for these six categories. Events that represent significant threats in some industries may be construed as immaterial in others. The COSO guidelines provide some suggestions about various techniques that could be used to develop a listing of events and also about the types of factors that should be considered during the event identification initiative. However, the guidelines stress that the event identification process must be tailored to fit each business model and that the full scope of the organization should be included.

The objectives for event identification specified in the COSO guidelines include (a) considering all events that could impact performance across the entire scope of the organization, and (b) accounting for interdependent nature of business processes when developing categories of events to consider. The systems-thinking approach described in this paper can help an organization accomplish those objectives by (1) providing a holistic perspective that fosters comprehensive event identification, and (2) creating a framework for event identification based on a model of the interaction among the components of a value system.

Appendix. Excerpts from Loblaw Companies, Ltd. by Greenwood and Salterio (2002)

The grocery industry in Canada is competitive and dominated by eight major chains that hold approximately 75% of the traditional food distribution market. Loblaw Companies Ltd. is the market leader in Canada and the eighth largest in North America. The industry has shown little growth in recent years and faces increased competition from nontraditional retailers such as warehouse clubs (e.g., Costco), drug chains, mass merchandisers (e.g., Wal-Mart), and Internet companies. Furthermore, customers are increasingly moving away from traditional food items in favor of food-away-from-home purchases. In response, grocers are investing heavily in new distribution and logistics technologies in order to lower costs and provide better service. They also are changing the balance of products favoring fresh produce and ready-made meals. Loblaw, the market leader, has been at the industry forefront in introducing several of these changes.

The current strength of Loblaw Companies contrasts with its position 25 years ago when Galen Weston assumed the chairmanship of the parent company. Loblaw was

underperforming, and had ownership interests in scattered retail and wholesale companies in Ontario and other provinces. Among Galen Weston's first steps was to hire several exceptionally creative young managers, including Richard J. Currie, who before long was given responsibility for Loblaw Companies Ltd.'s retailing and wholesaling operation in North America.

Currie revitalized the retail and wholesale operations. He had store interiors and exteriors refreshed with bold colors and installed theatrical intensity lighting to highlight products. A rigorous and imaginative corporate identity program made every Loblaw location and product instantly identifiable and set new standards for such programs in North America. Significant emphasis and effort were placed on private brands and for improving the quality of fresh foods. Visually attractive and contemporary promotional materials and techniques complemented the merchandise and its presentation. The multi-faceted assault on customers' attention worked. Customers flocked to the stores and the Loblaw renaissance was underway.

Loblaw consistently has invested in refurbishing and upgrading its stores. Improvement in décor and layout has been a high priority since Richard Currie became President. Stores in existing markets are enlarged and modernized regularly. In determining where to build or relocate stores, management follows careful analysis of demographics and consumer spending patterns. Loblaw assesses national market demand (projected potential sales) for each of its existing and potential sites.

A noticeable trend has been the movement to larger stores. Larger stores, in general, are more profitable than smaller stores because of the greater variety of nonfood items that can be offered (e.g., pharmacy, health and beauty care, general merchandise, photo-finishing, dry cleaning, flowers, music, videos, books, printing, postal services, and travel services). Recently, banking services were introduced in some stores through PC Financial in collaboration with the Canadian Imperial Bank of Commerce, one of the largest banks in Canada. This movement to one-stop shopping is a worldwide trend in the grocery industry.

Loblaw is alert to market trends. Information on consumer spending patterns and product choices comes from three main sources: product sales data, customers, and vendors. Store managers monitor changing purchasing patterns in their stores and division category managers interpret trends from aggregated sales data. Sales of each item within a category also are monitored. Loblaw is able to track sales and revenue trends and its share of the market for individual items through its subscription to surveys conducted by AC Neilson.

From the retailer's perspective, it is preferable to have national rather than regional brands with fewer vendors. Category management is widely regarded in the industry as a blend of financial analysis, demographic changes, and "gut feel." Customers are surveyed in a sample of stores, providing satisfaction data on each department. Surveys and focus groups are conducted outside the stores.

Catering to the needs of particular customers is increasing. Within stores, products reflect the needs of groups such as families, the elderly, vegetarians, diabetics, the health conscious, etc. Products are sold in large sizes known as "Club Pack" for the bulk buyer, while older customers need smaller packages and larger labels. In recent years, Loblaw has responded to the growing demand for "meal solutions." Thus, food sometimes is

grouped less by department, but rather by how it can be combined to make a complete meal.

Given the time pressure on consumers, convenience and speed of service are increasingly important. Loblaw has responded with accessible layouts and improved checkout technology to speed the checkout process. The importance of speed is reflected in the shift from buying ingredients to buying ready-prepared meals. In response, Loblaw is expanding the availability of ready-prepared meals, sales of which tripled in 1997 as a percentage of total supermarket industry sales.

Loblaw is a strong competitor because it can respond quickly to consumer spending patterns by aligning stores types and formats to changing neighborhood demographics. The range of formats partly reflects the process of growth through acquisition. Loblaw strategically uses its formats to serve various segments of the market and to target different consumer categories.

For example, the "No Frills" format is a low-price, modest-sized option. "Loblaws" is a larger, competitively priced format with a greater range of items in a more up-scale setting. These different formats (i.e., size of store, range of products, and combination of price/service) are used in different neighborhoods. As the neighborhoods change, so do the formats. The ability to alter formats is underpinned by the flexibility provided by the long-standing preference within Loblaw for owning, rather than leasing, its real estate sites.

The use of private-labels has been a significant contributor to Loblaw's success. These higher margin labels now constitute 35% of Loblaw's grocery unit sales, significantly above the industry average of 28%. The two most prominent labels are the low-priced "no name" and the premium quality "President's Choice." The latter is developed in the company's own facilities and then sent to leading manufacturers for production.

The Loblaw category management team determines which stock keeping units (SKUs) within each product category to sell. Current strategies include adding private-label products where appropriate. Two principal management techniques are employed: (1) comparing product sales in stores with similar demographic markets (especially new stores) that over time can suggest changes in category product mix for a store and (2) using industry data collected by AC Neilson, an independent market research firm.

Based on category analysis and management's "gut feeling," Loblaw develops private-label products when it finds a market niche within a category where the consumer will purchase a product that is not a national brand. Loblaw can introduce either a premium private-label product (President's Choice) and/or a generic (no name) product. The principal differences between the two are product quality and unique features (i.e., a premium product has higher quality than the leading national brand and may incorporate some features that cannot be replicated easily by competitors). Loblaw benefits in two ways from having private-labels: products that are only available at its stores and markups that are more consistent and less volatile on these products than on national brands, a commonly cited advantage to private-label products.

The goal of the price-management team at Loblaw is to ensure that Loblaw meets its commitment to competitive pricing while maintaining a profitable, growing business. In meeting this objective, Loblaw's price-management team carefully prices each product in

a category and considers relative price relationships within the category (i.e., Loblaw's private-label products priced below national brands in any category) and for substitute goods (i.e., instant coffee vs. ground coffee). To ensure competitive pricing, Loblaw carries out a program of extensive price checks at competing stores in each of its markets.

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