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Holistic system thinking as an educational tool using key indicators

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Abstract

Risk identification represents one of the components of the risk management program. It involves developing a list of events that could affect the ability of the enterprise to meet its objectives. The focus in this paper is on how risk management components are related to entity performance indicators in order to identifying events that could influence the performance and business control effectiveness. The paper suggests general procedures for identifying events that affects business performance using holistic system thinking to develop framework for identification of events that could threaten the organization's ability to achieve its performance objectives. The purpose is to understand the basic fundamentals in identifying, specifying, selecting and implementing quality indicators to create a powerful management reporting. We will seek to analyze relationships between risk, performance and control indicators, define and establish a standard specification for suitable metrics to measure, monitor and manage business processes, and create holistic system model to identify events that could threaten business performance.

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1. Introduction

The rapid evolution of science and technology has changed the management in the effort of achieving the competitive advantage. Business organizations across a variety of industries have begun to explore enterprise risk management which involves anticipating and managing business risks before problems occur. Boards of directors have become aware of their responsibilities related to effective oversight of management's execution of the wide management processes. Many organizations are embracing an impact evaluation process which represents the

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leading indicator and addresses the following questions: What business results can be analyzed? What did we do? What happened as a result? Are results as predicted? How the report is organized? What additional business results could be achieved? Measuring intentions against predicted results allows companies to improve continuous training. By measuring the effect on the company profits from participant intention, adoption, and impact, a company can maximize organizational and business results.

2. System thinking in event identification

Getz (1997) comments that “events are transient and every event is a unique blending of its duration, setting, management, and people”. Events with a potentially negative impact represent risks, which require management planning, assessment and response. An effective process for analyzing risk events must identify how each process helps the organization achieve its business objectives, and describe the component activities that comprise the process (Knechel, 2002). Event identification process has two objectives: (1) focus on developing an exhaustive list of potential events, (2) recognize interdependencies among events. It is 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). Event categories should be organized around internal and external risk factors. Internal factors include e. g. infrastructure, technology, process, and personnel. External factors include e. g. economic, business, technological, environmental, political, and social factors.

Risk can be defined as “the likelihood that the outcome from a process will not meet expectations” (Knechel, 2002). According to Bell et al. (1997) business risks represent threats to the ability of an enterprise to execute business processes in accordance with strategic objectives.

Models specify the structure and the nature of interaction among components. Modeling involves (1) identifying key system components, (2) determining how components behave, (3) defining the system structure, (4) mapping relations among components, (5) determining how individual processes accomplish their function (Serman, 2000). Serman (2000) claims that effective systems modeling involve constant iterations of reevaluation and refinement.

For the business process to perform effectively, component procedures must be capable of producing the desired results, and agents must execute the procedure correctly. These requirements are influenced by the design, infrastructure support and external environment. 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 overall system before attempting to analyze the component parts (Ackoff, 1999). Ackoff and Emery (1972) used the system-thinking approach 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.

An essential skill in systems-thinking is the ability to develop an overall mental representation that provides a big picture perspective (Gharajedaghi, 1999). Categories for grouping events in the system thinking should be process-focused, so that categories reflect the impact that an event has on related events in the value creation process. Each process, as well as each activity, must be understood in the context of its relationship to the people and organizations. Empirical research has demonstrated that mental models developed through the holistic lens of systems-thinking focus attention differently than traditional mental models (Jacobson, 2001). The differences in mental models produced by a holistic focus are associated with differences in decision making. Holistic systems-thinking approach helps better understand systems of business performance and its integrated risk components in overall risk assessment. Holistic perspective helps people to understand how interdependence components link together to determine overall performance.

Development of the holistic perspective on a business model involves (1) identifying systems of activities that drive performance, and (2) developing a process model. System design must be understood across (1) the structure of system components and their relationship to each other, (2) the function of each component, and (3) the process of activities required at any point in time (Gharajedaghi, 1999). Applying systems-thinking to identify events that drive performance begins by specifying the design of the business model by modeling the structure of the processes and functions used to create value (Haines, 2000).

3. Relationship between indicators

(Kaplan, 2001) differs three types of indicator: (1) exposure (risk) indicators, (2) control effectiveness indicators,

and (3) performance indicators. Key performance indicators (KPIs) measure performance or the achievement of targets. Key control indicators (KCIs) are used to measure the effectiveness of particular events at a particular point of time. Key risk indicators (KRIs) are metrics that provide information on the level of exposure to a given risk at a particular point in time (KPMG, 2001).

Risk indicators are metrics used to monitor risk exposures over time. They become “key” when they track important risk exposures (a key risk), or they do so especially well (a key indicator), or ideally both. Metric may be considered to be a risk indicator when it can be used to measure: (1) the amount of exposure, (2) effectiveness of controls, (3) quality of risk management. According to (IOR, 2010) every indicator has to: (1) be risk sensitive, (2) provide management with information on the risk profile of the organization, (3) represent meaningful drivers of exposure, which can be quantified, and (4) be used across the entire organization.

The differentiation between risk, control effectiveness and performance indicators is largely conceptual, because the same piece of data may indicate different things to different users (Figure 1).

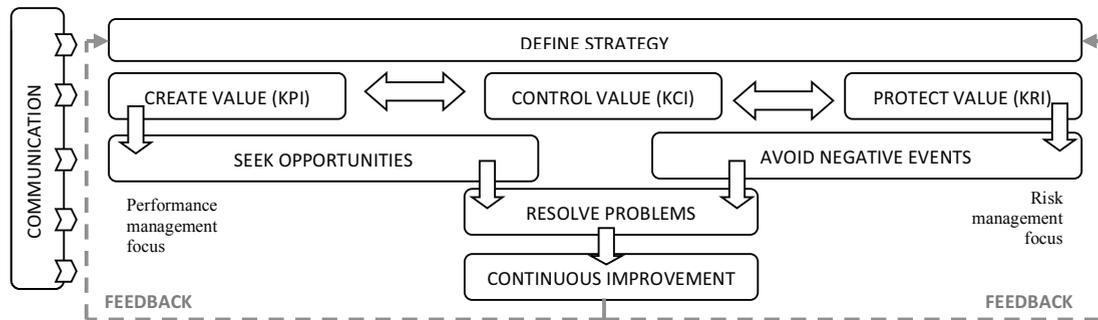


Fig. 1. The relationship between indicators

Miccolis et al. (2001) claims that good KRIs should: (1) apply to at least one specific risk and one business function or activity, (2) reflect objective measurement rather than subjective judgment, (3) track at least one aspect of the loss profile or event history, such as frequency, average severity, cumulative loss or near-miss rates, (4) provide useful management information, (5) be cost-effective to collect, (6) be readily understood and communicated. Indicators must have relevance to what is being monitored. The relevance of indicators and their data over time should focus on the information customer, not the data provider.

New indicator implementation should be agreed by stakeholders to ensure that everyone agrees with (1) used measurement techniques, (2) represented values, (3) calculation methods, and (4) variances in the handled values. Indicators are (1) specific, (2) general, or (3) generic focused. It is not possible to determine a universal set of key indicators because of the change of their nature or severity. It is generally better to start with a small set of indicators and collect the data manually, what facilitate the understanding of data sources and their usage. Good indicators quickly convey the message, without the need of information comparison.

Metrics provide a means for identifying: (1) leading, (2) lagging, and (3) current indicators. According to Parmenter (2008) the types of key indicators are: (1) leading – typically financial, (2) – non – financial, (3) input – measure assets and invested resources, (4) process – measure the efficiency or process productivity, (5) output – measure financial and nonfinancial results, (6) outcome – reflect overall results, (7) qualitative, (8) quantitative, (9) functional – relevant for an organizational main capability, (10) industry – specific for a particular line of operations or industry. In reality, many indicators are both lagging and current, and can also have a leading element to them that may need to be considered. Leading (preventative) indicators are rare and are usually related to causal drivers. A misconception about leading indicators is the assumption that establishing future value from historical trends results in a leading indicator of risk. Single indicators need context in order to become predictive. This implies the need for composite indicators (IOR, 2010). Our suggested potential composite indicators (CIs) are: (1) Process quality indicator – PQI, (2) Employee satisfaction index - ESI, (3) Client satisfaction index - CSI, (4) Financial stability index - FSI. These indicators cover four general perspectives (financial, customer, process, and learning perspective) of business performance (Fig. 2).

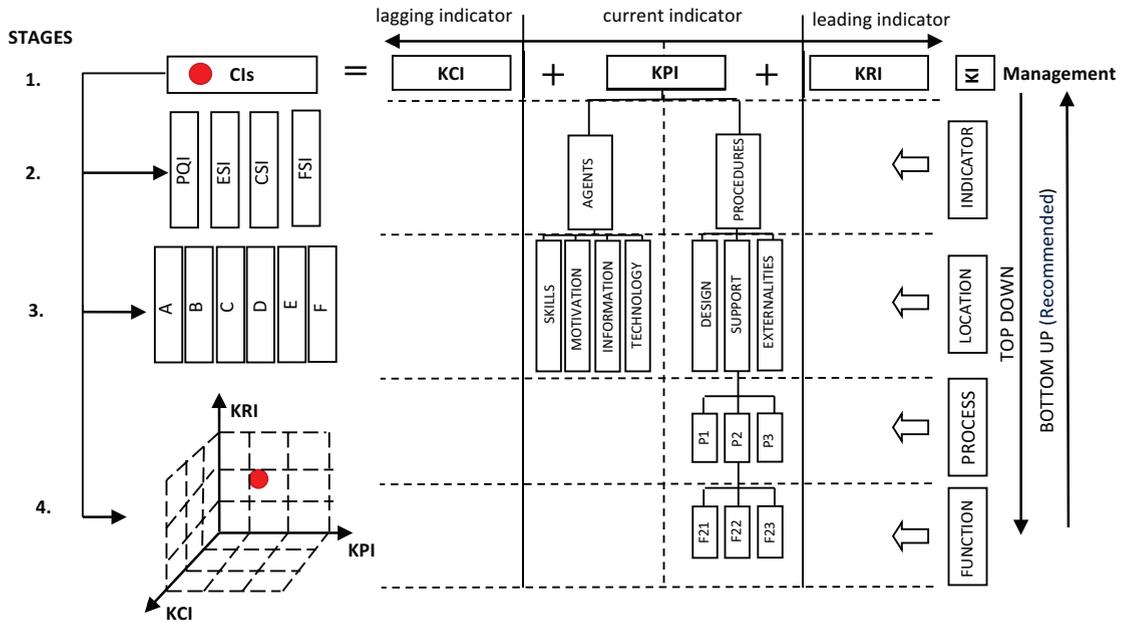


Fig. 2. The KPI, KRI and KCI indicators

The third step to identify the underlying indicators that measure the underlying causal drivers impacting business performance. The selection of underlying indicators depends on business preferences. In this paper we suggest the following: (A) historical error rate, (B) historical staff availability levels, (C) transaction volumes over time, (D) transactional volatility over time, (E) historical average transaction value, (F) average cost of error correction (Figure 2).

The important factors are the time and the frequency of measurement of indicators. The more often an indicator is updated, the more useful the data will be. When indicators show only small changes, it is important to consider longer term trend before arriving at conclusions. Data may not always be available to measure all the indicators as required. The potential solution of data shortage is to identify significant areas of exposure and select indicators relevant to each of those areas. Nevertheless, once an indicator is made a target it may lose its relevance, which could be because management starts to focus on managing the indicator rather than any associated risks or issues.

According to Kádárová et al. (2012) every composite indicator should have the following characteristics: (1) aligned, (2) relevant, (3) owned, (4) comparable, (5) optimal amount, (6) understood, (7) balanced, (8) linked, (9) standardized, (10) verifiable, (11) reinforced, (12) incentivized, (13) cost effective, (14) attributable, (15) responsive, (16) well timed, (17) supporting innovation, (18) clearly.

Benefit of using composite indicators lies in their ability to link current exposure levels to risk appetite by monitoring a set of appropriate risk, performance and control indicators and checking their actual values and trends against agreed limits. Limits may take several different forms, including: (1) an upper boundary, (2) a lower boundary, and (3) a combination of an upper and lower boundary. Organization should periodically review the limits applied to the composite and key indicators because the narrow limits will result in false alerts and with too broad limits the organization learns too late that a major issue has suddenly emerged.

4. Conclusion

Using management’s own measures of success helps deepen stakeholder’s understanding of progress and movement in business. Once an organization has analysed its mission, identified all its stakeholders, and defined its goals, it needs a way to measure progress toward those goals. A system thinking approach helps the organization develop a

holistic perspective on its business model by specifying the procedures and agents that drive each component process. Every business model is different and each organization must develop its own list of specific key indicators. Key indicators are one of the most powerful tools available to enable companies to achieve their business objectives. Indicators should be primarily deployed for learning and improvement and focused on meaningful projects that will assist in reaching objectives faster.

The main objective of this research is to explain the basic relationship between key indicators that will support existing measurement framework(s) during the process of performance measurement systems' design, implementation and use, and to advance the decision-making process in the learning organization.

References

- Ackoff, R. & Emery, F. (1972). *On purposeful systems*. Chicago: Aldine-Atherton.
- Ackoff, R. (1999). *Ackoff's best: his classic writings on management*. New York: John Wiley & Sons.
- Bell, T. at al. (1997). *Auditing organizations through a strategic-system lens: the KPMG business measurement process*. KPMG Peat Marwick, LLP.
- COSO (2004). *Committee of Sponsoring Organisations of the Treadway Commission. Enterprise Risk Management. Integrated Frameworks. Executive Summary*. September 2004. Jersey City, NJ: American Institute of Certified Public Accountants..
- Getz, D. (1997). *Event Management and Event Tourism*. New York 1997: Cognizant Communications Corporation.
- Gharajedaghi, J. (1999). *Systems thinking: managing chaos and complexity – a platform for designing business architecture*. Boston, MA: Butterworth Heinemann.
- Haines, S. (2000). *The systems thinking approach to strategic planning and management*. New York: St. Lucie Press.
- IOR (2010). *Institute of Operational Risk. Operational Risk Sound Practice Guidance. Key Risk Indicators*.
- Jacobson, M. (2001). *Problem solving, cognition, and complex systems: differences between experts and novices*. *Complexity*; 6.3:41 – 9 [January/February].
- Kádárová at al. (2012). *Performance management and key performance indicators*. *Transfér inovácií* 24/2012. Košice.
- Kaplan, R. S. & Norton, D. P. (2001) *Translating The Balanced Scorecard from Performance Measurement to Strategic Management: Part 1. Accounting Horizons*
- Kim, D. (1999). *Introduction to systems thinking*. Waltham, MA: Pegasus Communications Inc.
- KPMG. (2001). *Understanding enterprise risk management: an emerging model for building shareholder value*; Whitepaper prepared by the Assurance & Advisory Service Center
- Miccolis, J. at al. (2001). *Enterprise risk management: trends and emerging practices*. Altona Springs, FL: Institute of Internal Auditors Research Foundation.
- Parmenter, D. (2008). *Klíčové ukazatele výkonnosti: Rozvíjení, implementování a využívání vítězných klíčových ukazatelů výkonnosti*. Přel. I. Petrašová. Praha: Česká společnost pro jakost, ISBN 978-80-02-02083-7
- Robert N. Knechel, & David O'Connor (2002). *Business Risk Management and Audit Risk 2002*. Professional development course paper. Institute of Chartered Accountants of New Zealand. ISBN 1877255947
- Sterman, J. (2000). *Business dynamics: systems thinking and modeling for a complex world*. Boston: Irwin McGraw-Hill.

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