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The yield of enterprise can be accretion by integrating systems to business partners to create highest competitive advantage in the time of run. System integration can be done by adopting the e-commerce technology and Business-to-Business models that will connect with external organizations. With this complication of system integrations, risk management is often supervised because project managers are overwhelmed by the occurring problems and deadlines. If risks are properly identified and handled, the integration project can be even more smoothly implemented. The theoretical section provides understanding objects system integration and risk management while the empirical data is gathered via interviews with people who have experience and knowledge about the system integrating implementation. The results of the study present the major areas of risks that should be considered.

Keywords: Enterprise, System, Integration, Business, Risk.

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1. The Enterprise Information System

Enterprise entities take advantage of the efficiency from Enterprise information system. Some of this enterprise information systems (are software packages, such as ERP system) are relatively expensive to implement, and also inflexible and costly to customize (Sarkis & Sundarraj 2006). Enterprise entities find themselves competing in the global market either cutting costs or improving efficiency. Having integrated Business-to-Business e-commerce technologies to the enterprise systems, business environment tend to stay competitive over others. The primary drive for these movements toward efficiency gains has been the use of enterprise systems to streamline internal operations and Business-to-Business e-commerce technologies that facilitate the tight linkages with external organizations (Sutton et al 2006). The inter-organizational systems should be implemented to facilitate the integration business process such as the electronic exchange of information flows (Themistocleous et al 2002).

Type of Enterprise Information System. Enterprise resource planning software systems attempt to integrate all departments and functions across a company onto a single information system that can serve all those different departments' particular needs. Typically, a department with specialized functions and needs may have its own information system, customized to its particular procedures and duties. Nonetheless, the main effort of an ERP implementation is to combine as much functionality as possible into a single, integrated software program that runs on a single database, in order that the various departments can easily share information and communicate with each other (Tarantilis et al 2008). Enterprise resource planning systems are a one big vendor software package that helps provide best-practice business process functionality running on a single database (Light & Wills 2001). Currently SAP and Oracle are globally accepted as leading Enterprise Resource Planning vendors on this market. The enterprise information systems need to be flexible and adaptive to respond to the changing business needs. Evgeniou (2002) describes **four types of organization** that relate to their enterprise system types. The first one is **standardized enterprise** which is lack of inflexibility. The second one is **steady state** which has low requirement to be flexible. The third one is **decentralized enterprise** which requires the flexibility to change in the organization but has limited of visibility to global business. The last one is **adaptive enterprise** which has high visibility and flexibility. This type of enterprises has the system that can support internal process and also provide inter-organization processes such as electronic supply chain system.

Enterprise Integration. Recently many organizations use the process called enterprise integration as a key technique to transform their business processes to pursue the e-business benefits. Integration is the organizations linkage of their systems to partner systems. The enterprise integrates its own business processes with those of its business partners to increase efficiency within a collaborative value chain (Wing & Venky 2004). The e-business current solutions mostly rely on enterprise integration requirements to integrate web-based systems to each other and heterogeneous legacy systems which belong to the organization, its business partners, or other service providers.

The figure 1 gives an overview of enterprise integration methodology. The three concentric rings represent the **key management aspects** of enterprise integration project which are **inner, middle, and outer rings**. The inner ring represents the process you follow to solve an EI problem, while the middle ring contains the deliverables you produce by following the process, lastly, the outer ring lists risks you must manage during the process to ensure the project's success (Wing & Venky 2004). The six sectors overlaid the rings represent an enterprise integration project's phases.

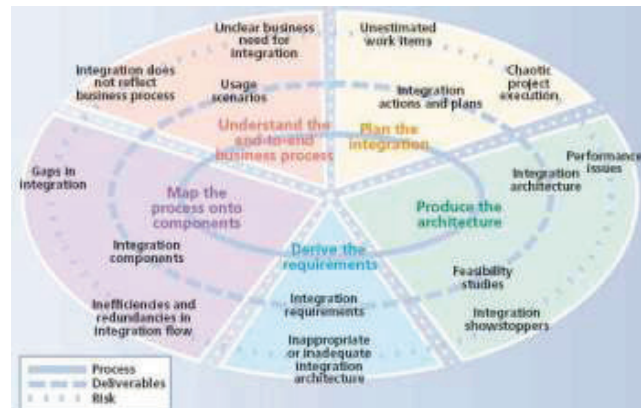


Figure 1. The enterprise integration methodology

Important Factors of System Integration. There are various risks that have potential to arise, such as losing or missing data, or the system processing failure. These risks come from the inconsistency of computer-based systems, for example, a system infrastructure is not properly planned by system architects and developers will lead to unsatisfied reliability of the Business-to-Business technologies (Dean et al 2003). Assurance over risks is related not only to technical and application issues, but also business integration, which are critical to consider. Imed (2000) states that the criteria of the effective functioning of extended enterprise are as the following factors:

- **Autonomy of partners** - which supposes that each one is free to manifest and to take initiatives
- **Added value** - there is no exchange unless each partner finds it beneficial; the value added by each one must be appreciated precisely.
- **Adapting to change** - in so far as it privileges the functional links between its members, the network must facilitate their adaptation to change.
- **Mutual aid** - mutual aid between the members is fundamental.
- **Reciprocity** - is an essential rule that the network can only function if each partner receives and gives.
- **Shared values** - networks presuppose strong adhesion of each member to a system of values, network quality being a function of the quality of the values uniting its members.
- **Common vision** - poses many questions, for example, how members plan the future of the network, what the future collective goals are, etc.

There are some issues that should be examined for the large-scale extended enterprise system implementation. Westone (2003) mentioned that these following issues have potential to cause failures of proceeding with an extended enterprise planning and execution of the system.

2. Enterprise Risk Management

Risk is the net negative impact of the exercise of vulnerability, considering both the probability and the impact of occurrence. Risk management is a framework to classify risks, assessing risks, and mitigate risks to a tolerable impact. Risk management for enterprise is important that it provides useful information for management levels. It is how to handle uncertainty and how risky the management should make a decision with fewest impacts on the business. Uncertainty can be either risk or opportunity for the business, but opportunity can be maximized when strategy and goals are set by balancing growth, return of investment and risks. Enterprise risk management composes of aligning risk appetite and strategy, enhancing risk response decisions, reducing operational surprises and losses, identifying and managing multiple and cross-enterprise risks, seizing opportunities, and improving deployment of capital. These characteristics of enterprise risk management help management to achieve the enterprise performance and profitability targets and prevent loss of resources.

Risk Management Models. The process of risk management basically involves identification of risks or uncertainties, analysis of implications, response to minimize or mitigate risk, and allocation of appropriate contingencies. There are many effective risk management models that can be adopted, depend on suitability of each company or type of the implementing project. For example, the major processes of the supply chain risk management are identify risk, determining the risk management strategy and actions, executing and implementing actions, and monitoring the risk management process and the results, as shown in the figure 2 (Deloitte 2008).

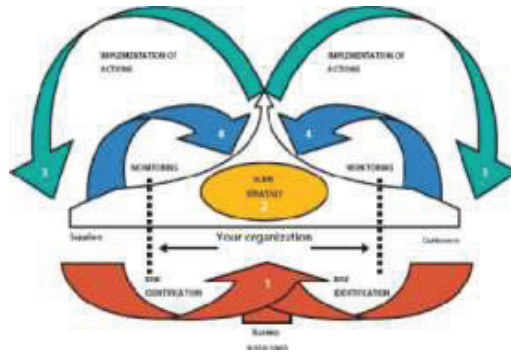


Figure 2 Supply Chain Risk Management Process

In any system integration projects that adopt framework of system development life cycle (SDLC), risk management can be used efficiently and differently for each phase. It can be summarized as the table 1.

Risk assessments can be used as a means of providing decision-makers with information needed to understand factors that can harmfully impact operations and products, and giving concerns about the degree of actions needed to reduce risk. As the consequences of the growing technology, information security risks can be no longer overlooked by the government or business. The risk assessments generally include *identifying threats, estimating the possibility, estimating the potential losses or damage, and identifying cost-effective actions*. Cooper (2005) explains the descriptions of assessment approaches in the step of assigning priority to the risk as following:

- **Qualitative analysis** is based on descriptive scales such as low, medium, high for describing the likelihoods and impact of risk. This is approach useful when the enterprise wants to do quick assessment reviewed or initial review.
- **Quantitative analysis** uses numerical ratio scales for likelihoods and impact, rather than description scales
- **Semi - quantitative analysis** is the combination between quantitative approach and qualitative approach. The number will be assigned for descriptive scale.

SDLC Phases	Phase Characteristics	Support from Risk Management Activities
Phase 1— Initiation	The need for system integration is expressed and the purpose and scope of the integration is documented	Identified risks are used to support the development of the integration requirements, including security requirements, and a security concept of operations (strategy)
Phase 2— Development or Acquisition	The integration is designed, purchased, programmed, developed, or otherwise constructed	The risks identified during this phase can be used to support the security analyses of the IT system that may lead to architecture and design trade-offs during system development
Phase 3— Implementation	The security features of the integrated system should be configured, enabled, tested, and verified	The risk management process supports the assessment of the system implementation against its requirements and within its modeled operational environment. Decisions regarding risks identified must be made prior to system operation
Phase 4— Operation or Maintenance	The integrated system performs its functions. Typically the systems are being modified on an ongoing basis through the addition of hardware and software and by changes to organizational	Risk management activities are performed for periodic system reauthorization (or re-accreditation) or whenever major changes are made to the integrated system in its operational, production environment (e.g., new system interfaces)

Phase 5— Disposal	This phase may involve the disposition of information, hardware, and software. Activities may include moving, archiving, discarding, or destroying information and sanitizing the hardware and software	Risk management activities are performed for system components that will be disposed of or replaced to ensure that the hardware and software are properly disposed of, that residual data is appropriately handled, and that system migration is conducted in a secure and systematic manner
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Table 1 Integration of Risk Management into the system development life cycle

Stoneburner (2002) has illustrated a sample of risk assessment methodology for IT systems as the following steps (in the figure 3).

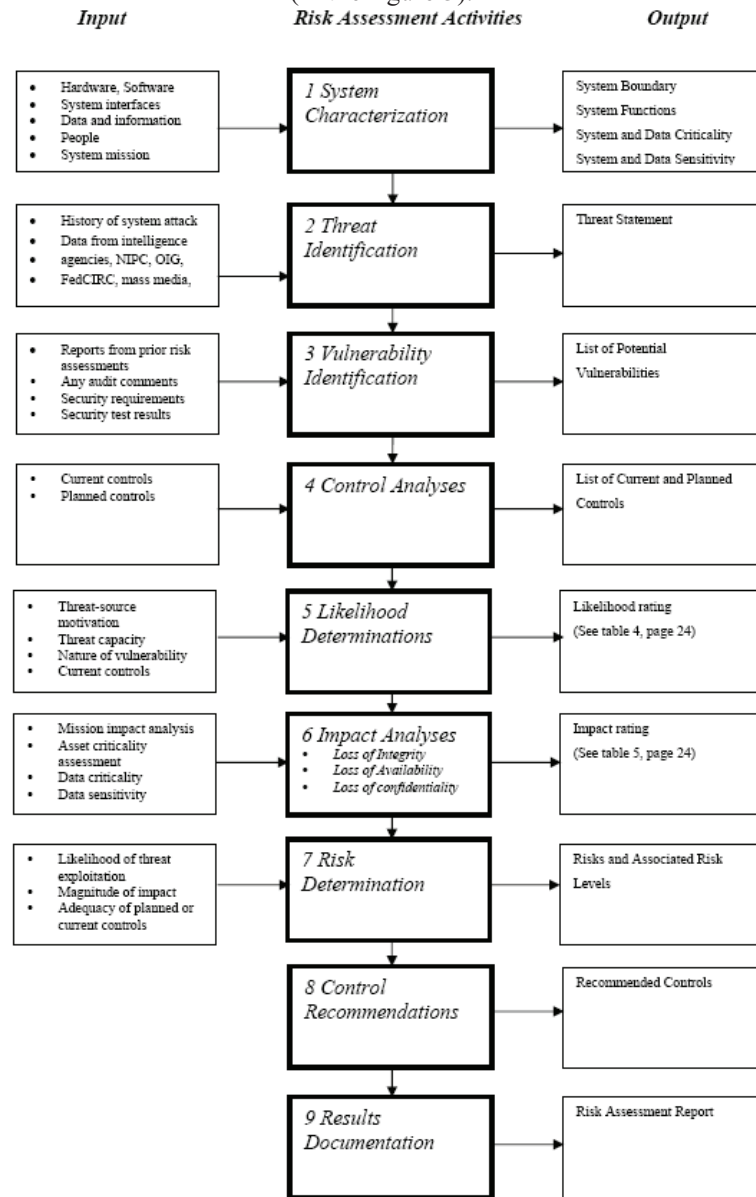


Figure 3 Risk Assessment Methodology Flowcharts

A threat is any agent such as person, activity or event that has potential to damage a system such as type of data processes, stored, and transmitted. Vulnerability is a weakness in the information system design, implementation, internal controls, security control that could be exploited by threat which accidentally triggers or intentionally exploited (Stoneburner et al 2002). The vulnerability is the potential weakness in the system that may be attacked or exploited by threats. The vulnerability in the systems may be found in system design, physical layout, administrators, procedure, personnel, management, hardware, or software.

Risk Determination step will assign risk priority to each risk by comparing the likelihood level (high, medium, low) and impact level. Risk management in extended enterprise systems composes of using risk sharing, control and prevention and financial instruments to lessen the effects of the integrated operational chain risks and their financial consequences.

Conclusions

The integration between partners along the supply chain is a complex and difficult task. Because there is complexity of the exiting systems on both sides of partners which are complicated systems, in many cases they are fixed, reconfigured, or lacking of documents. Moreover, the incompatibility problem and integration problem among systems of those parties such as different standards, computing languages, or platform and operation systems also make it more difficult for integrating task (Themistocleous et al 2004). The risks that derive from the technical factors, has essential impact to other risks (Sutton et al 2008).

References

1. Cooper, D., Grey, S., Raymond, G. & Walker, P., 2005. Project Risk management guideline: Managing risk in the large projects and complex procurements. Hoboken, NJ: J. Wiley
2. Dean K., Alan F., Paul G., Julian J. & Doug P., 2006. Just What Could Possibly Go Wrong In B2B Integration?. Computer Software and Applications Conference, 2006, COMPSAC 2006, Proceedings, 27th Annual International, p. 544-549.
3. Deloitte, D. 2008. Enterprise Risk Services: Supply Chain Risk Management [Online]. Available at [http://www.deloitte.com/dtt/cda/doc/content/nl_eng_brochure_supply_chain_risk_management_070704x\(1\).pdf](http://www.deloitte.com/dtt/cda/doc/content/nl_eng_brochure_supply_chain_risk_management_070704x(1).pdf)
4. Evgeniou, T., 2002. Information integration and information strategies for adaptive enterprises. European Management Journal, 20 (5), p. 486-494.
5. Gleghorn, R., 2005. Enterprise Application Integration: A Manager's Perspective. IT Professional Magazine, 7, p. 17.
6. Light, B., Holland, C.P., & Wills, K., 2001. ERP and Best of Breed: A Comparative Analysis. Business Process Management Journal, 7(3), p. 216-224.
7. Sarkis, J. & Sundarraj, R.P., 2006. Evaluation of enterprise information technologies: a decision model for high-level consideration of strategic and operational issues. IEEE Transactions on Systems, Man and Cybernetics, Part C (Applications and Reviews), 36(2), p. 260-273.
8. Stoneburner, G., Goguen A., & Feringa, A., 2002. Risk Management Guide for Information Technology Systems. National Institute of Standards and Technology, NIST Special Publication.
9. Sutton, G., Khazanchi, D., Hampton C. & Arnold V., 2008. Risk Analysis in Extended Enterprise Environments: Identification of Critical Risk Factors in B2B E-Commerce Relationships. Journal of the Association for Information Systems, 9(3-4), p. 151-156,158,160,164-166,168-174.
10. Tarantilis, C.D., Kiranoudis, C.T. & Theodorakopoulos, N.D., 2008. A Web-based ERP system for business services and supply chain management: Application to real-world process scheduling. Journal of European Journal of Operational Research, 187(3), p.1310-1326.
11. Themistocleous, M., Irani, Z. & Love, P. E., 2004. Evaluating the integration of supply chain information systems: A case study. Journal of European Journal of Operational Research, 159(2), p. 393-405.
12. Weston, F.C. Jr., 2003. ERPII: The extended enterprise system, Business Horizons [Online]. Available at <http://balrog.sdsu.edu/~shu/Weston%20ERP%20II.pdf>
13. Wing, L. & Venky, S., 2004. Enterprise integration methodology. Enterprise Information Management, 18(5), p. 511-530.