IT governance implementation framework in small and medium enterprise

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Abstract: IT governance mechanisms approach to facilitate associated decision process in large organisation, but IT governance structures in small and medium enterprises (SMEs), is quite limited. SMEs tend to have an idiographic profile with characteristics that differs strongly from large business. Therefore, the purpose of this paper is assessing whether IT governance is applicable to SMEs. We needed a framework of IT governance in SMEs. Under the objectives, we studied literatures about IT governance and standards, SMEs and corporate governance. With the results we created the framework of IT governance in SMEs and in implementing this framework. A case study of traditional industry is shown in the implementation of IT governance. Case X-Company has some pros and cons in the implementation of IT governance.

Keywords: IT governance; small and medium enterprises; SMEs; corporate governance.

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1 Introduction

IT governance is an integral part of enterprise governance and consists of the leadership and organisational structures and processes that ensure that the organisation's IT sustains and extends the organisation's strategies and objectives (IT Governance Institute, 2003).

IT governance is a new area in IT management and strategic IT leadership (Weill and Ross, 2004). According to the definition, IT governance is more than IT management that has a strong internal orientation to the entity.

SME are engine of growth in prosperous and growing economy and play an important role in creating economic growth. But, SMEs deviate from large companies in their way of business management (Albayrak and Gadatsch, 2012). The literature portrays SMEs as complex and quite different from large business specifically in relation to resource (McAdam, 2002), markets (Chetty and Campbell-Hunt, 2003), flexibility (Freel, 2000; Cecora, 2000), leadership (Fuller, 2003). SMEs had been neglected and overlooked by governance's economic initiatives and polices in favour of larger enterprise (Mahmood, 2008). Therefore, it is motivated us to study how IT is managed for SMEs and IT governance in SMEs. We have conducted as research method a scientific survey on the organisation of IT on SME. Section 2 starts the major objective of IT governance and important of IT governance. In Section 3, IT governance in SME will discuss, it included SME characteristic and Problems, IT in SMEs, and IT governance in SMEs. IT governance framework in SMEs will propose in Section 4. In Section 5, build an implementing Framework. Case study is showing the implementing of IT governance in Section 6. Finally, the conclusions are summed in Section 7.

2 IT governance in large enterprises

IT governance is defined as procedures and policies established in order to assure the IT system of an organisation sustains its good strategies (Haes and Grembergen, 2004). In ISO/IEC 38500 standard, IT governance has been identified as the strategic alignment of IT with the business so that maximum business value is achieved through the development and maintenance of effective IT control and accountability, performance management, and risk management. The import of IT governance is about how to obtain optimum returns from investment in IT and how to ensure that measurable and transparent long-term sustainable stakeholder value is achieved (Weill and Ross, 2004). Hence extracting maximum value from existing investment is imperative for IT governance (Parker, 2005).

2.1 The objectives of IT governance

IT governance is the process by which organisations align IT actions with their goals and objectives. The major objectives of IT Governance are to (Ridley, 2006):

- enable the strategic and tactical alignment of IT with communicably bank priorities
- understand the value and impact of IT investments (dollars, human, resource, and capital)
- identify opportunities for improved IT utilisation
- support visible and transparent decision making
- establish and sustain effective IT policies
- establish performance measurements

- identify and mitigate risks
- satisfy regulatory and formal compliance requirements.

This leads to the six focus areas for IT governance. There are

1 value delivery
2 risk management
3 strategic alignment
4 resource management
5 process management
6 performance measurement
7 service management.

2.2 Why IT governance

It governance focus that achieving the link between business and IT, and the primary responsibility of the board of directors. The following two definitions are:

- IT governance is the responsibility of the board of directs and executive management. It is integral part of enterprise governance and consists of the leadership and organisational structure and processes that ensure that the organisation's IT sustains and extends the organisation's strategy and objectives.
- IT governance is the organisational capacity exercise by the board, executive management and IT management to control the formulation and implementation of IT strategy and this way ensure the fusion of business and IT (Haes and Grembergen, 2004).

Effective IT governance helps ensure that IT supports business goals, maximises IT investment, and appropriately manages IT related risks. It also helps achieve critical success factors by efficiently and effectively deploying secure, reliable information and applied technology. One of the major reasons IT governance is important is the exceptions and reality often do not match (IT governance Institute, 2003). Boards of directors usually expect management to: deliver IT solution of the right quality, on time and on budget, Harness and exploit IT to return business value, and leverage IT to increase efficiency and productivity while management IT risks.

2.3 Corporate governance and IT governance

The definition of IT governance as proposed by the IT governance Institute expresses that "IT governance is the responsibility of the board and executive management" and that IT governance "should be an integral part of enterprise governance". The term 'enterprise governance' is somewhat broader than 'corporate governance' and refers not only to businesses, but also to other organisations such as government agencies. Throughout this blog, the more common term 'corporate governance' will be used. It governance is a subset of corporate governance and is concerned with the con create with mitigation of

TT risks and aligning the business and IT to create value. It is much broader than IT management, and focuses on the present and future demands of business and the business customers (Servicexen-wordpress-com, 2008).

Corporate governance is the system by which organisations are directed and controlled and is concerned with holding the balance between economic and social goals and between individual and communal goals. The business dependency on information technology has resulted in the fact that corporate governance issues can no longer be solved without considering information technology.

Corporate governance should therefore drive and set IT governance. Information technology, in its turn, can influence strategic opportunities as outlined by the enterprise and can provide critical input to strategic plans. In this way, IT governance enables the enterprise to take full advantage of its information, and can be seen as a driver for corporate governance. IT governance and corporate governance can therefore not be considered as pure distinct disciplines and IT governance needs to be integrated into the overall governance structure (Grembergen, 2003).

The close relationship between corporate and IT governance can also be a definition of corporate governance: corporate governance "deals with the ways in which suppliers of finance assure themselves of getting a return on investment" (Haes, 2005).

Typical corporate governance questions are (Shleifer and Vishny, 1997):

1 How do suppliers of finance get managers to return some of the profits to them?

2 How do suppliers of finance make sure that managers do not steal the capital they supply or invest it in bad projects?

3 How do suppliers of finance control managers?

The business dependency on IT means that the corporate governance issues can not be solved without considering information technology. This relationship can be made more eloquent by translating the corporate governance questions into specific IT governance questions, which discloses that corporate governance issues can not be addressed, without considering IT governance issues (see Table 1).

Table 1 IT governance and corporate governance questions

Corporate governance questions	*IT governance questions*
How do suppliers of finance get managers to return some of the profits to them?	How do the board and executive management get their CIO and IT organisation to return some business value to them?
How do suppliers of finance make sure that managers do not steal the capital they supply or invest it in bad projects?	How do the board and executive management make sure that their CIO and IT organisations do not steal the capital they supply or invest it in bad projects?
How do suppliers of finance control managers?	How do the board and executive management control their CIO and IT organisation?

Source: Servicexen-wordpress-com (2008)

3 IT governance in SMEs

IT governance is an important concept for IT organisations. It core business companies use different standard(s) and/or framework(s) and some of them believe that their standard(s) and/or framework(s) has helped their organisation to reach higher maturity levels.

3.1 SMEs characteristic and problems

There is no official definition of what constitutes a medium-size enterprise. Business with between 100 and 199 employees are generally considered medium-size. The definition of SME of the institut fur mittelstandsforschung (ifM), where an SME must meet the following two requirements

1 its number of employees must be less 500

2 its annual turnover must be exceed 50 million Euros in Germany (Albayrak and Gadatsch, 2012).

We used the definition by Levy and Powell (2005), the term SME applies to firms employing fewer than 500 works in this paper.

Some of the contributions of SME are: encourage innovation and flexibility, maintain close relationships with customers and the community, keep large firms competitive, provide employees with comprehensive learning experience, develop risk takers, generate new employment, and provide greater satisfaction. But, SMEs are associated with a number of characteristics that distinguish them from large organisations, particularly with regard to their organisational structures, IT endow, The problems for SME included cash flow, unreasonable government regulations, energy and electricity costs, property taxes and taxes on business income. All the problems facing SME, a lack of funding is the biggest cause of distress for small business owners. Government regulations are also a concern, as many of the regulations that are intended for larger organisations affect small business inherently.

3.2 IT in SMEs

IT functions in SMEs tend to have a more centralised structure with Chief Executive Officer (CEO) or business owner (Yang and Judge, 2008). Because the limited resource available to small business, they often rely on outsourcing and external consultants for service and support. SMEs must exercise caution when using external consultant, as that they may not always be trustworthy and reputable (Gupta and Hammond, 2005). There are several factors that influence IT adoption in SME such as Resource (financial and management), limited technical skills and the outlook of CEO or owner (Chen, 2009). Therefore, SMEs required developing a comprehensive information security system (Gupta and Hammond, 2005). SMEs are more vulnerable to security attacks, and tend not to implement security management aspects like information security polices, training and awareness, back-ups and disaster recovery, and anti-virus protection.

3.3 IT governance in SMEs

An IT governance framework aimed in SME will have to address and comply with these seven characteristics to effectively support the implementation IT governance. These characteristics are: no boards of directors, limit management structures, small or non-existent IT departments, lack of resources, less complex frameworks, focus on information security, and low-cost system (Albayrak and Gadatsch, 2012). Therefore, the rules of IT governance framework of SMEs are:

1 IT governance framework in SMEs will have to make provision for business without boards of directors or similar structures

2 IT governance framework in SMEs must make provisions for business with limited management structures

3 IT governance framework in SMEs should not contain IT jargon and must be simple enough to be understood by non-IT staff or IT staff that do not specialties in IT governance

4 SMEs need an IT governance framework that is simpler and easier to implement, and only contain controls that are applicable to small business

5 SMEs need an IT governance framework that is less time consuming, costs less to implement and can be implemented by fewer employees

6 IT governance framework aimed at SMEs will have to include a strong emphasis on information security and address the common security risks affecting small business

7 SMEs should be able to implement an IT governance framework using general end-user software packages such as spreadsheets, word processors and e-mail.

A number of international standards are Control Objectives for Information and Related Technology (COBIT), International standard for corporate governance of information technology published jointly by the International Organization for Standardization (ISO) and the International Electro technical Commission (IEC) (ISO/IEC 38500), Information Technology Infrastructure Library (ITIL) and capability maturity model integration (CMMI). These standards are not necessarily mutually exclusive and increasing the value of IT from a business perspective requires an understanding of their strengths, weaknesses and focus.

COBIT is designed by the IT governance Institute as a high-level 'umbrella' standard for IT governance and it work very well with other standards like ITIL and ISO 38500 which focus on specific aspects of IT management. ITIL provides a systematic and professional approach to the management of IT service provision. ITIL's organised around five areas: business perspective, application management, infrastructure management, service delivery and service support. The objective of ISO 38500 is to "provide a model for establishing, implementing, operating, monitoring, reviewing, maintaining, and improving an Information Security Management System (ISMS)". CMMI is a methodology used to develop and refine an organisation's software development process. The model describes a five-level evolutionary path of

increasingly organised and systematically more mature processes (Mathiassen and Sorensen, 1996). The five maturity levels are: initial repeatable, defined, managed and optimising level.

Information Systems Audit and Control Association (ISACA) put emphasis on COBIT as reference framework for IT governance (COBIT 5.0). This framework defines a spread range of objectives within four domains but it does not determine how to reach them. ITIL is another framework that clearly explains service-based processes in the service provider companies. But, it is weak on KPI and CSF determination and security issues. CMMI also has high potential to cover majority of mentioned principles but in terms of security issues is very weak and almost do not have any disciplined specification for that. So, the best solution is compiling and implements some of most applicable standards and frameworks together to cover six IT governance principles (Ayat et al., 2011).

In SMEs, their processes are simple and short as up to four steps. There is no need to implement so many proposed processes as required by COBIT, ITIL, CMMI, and ISO/IEC 38500. In next section, we proposed a framework of IT governance in SMEs.

4 IT governance framework in SMEs

According the SME characters and problems, IT governance in SME must be contained the following functions: The organisation of IT, the degree of IT outsourcing, the perception of IT in the company, the use of standard models for IT governance, concerning current IT topics and on statistical information such as industry, company size, IT budget, number of IT staff and number of deployed desktop systems. From the above statements of Section 3, the framework of IT governance in SMEs is showed in Figure 1.

Figure 1 A framework of IT governance in SME

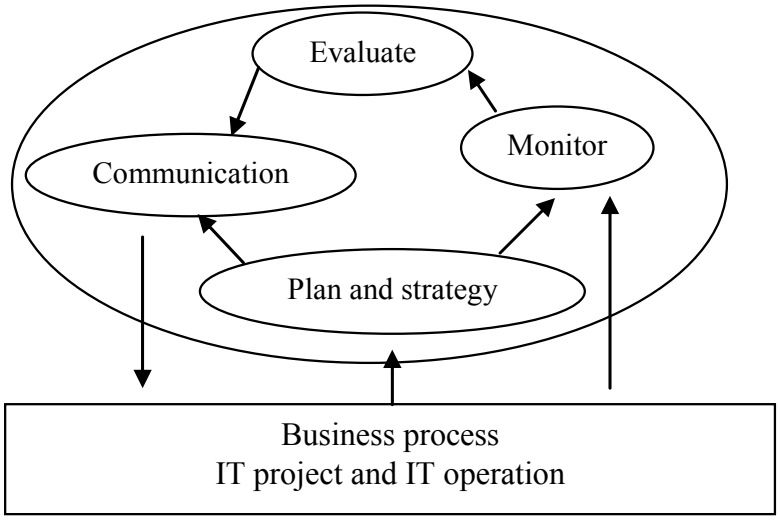

Table 2 Thematic areas and instruments of IT strategy in SMEs

	Issues	*Instrument*
Hardware	• IT infrastructure planning	• Planning of hardware
	• IT standards	• Standards for desk system
Software	• Application area for individual/standard software	• Usage strategy for software
	• IT development planning	• IT architecture
	• IT standards for proprietary development	
Service	• IT service	• IT service catalogue with service level agreements
	• Management of IT service providers	• IT service guideline
Process	• Process models/documentation	• IT project office
	• Project management/project management	• Project guideline manual
Operation	• Different Process (core processes, management process, and support process)	• IT development plan
	• Graphics tools of common office software packages	• Demonstrated graphically
		• Visualised and documented document
		• IT balanced scorecard
Outsourcing	• Dependence from external service providers	• High safety and fire safety standard for IT

The processes of the framework are:

1 *IT control organisation*

Chief information officer (CIO) or the head of Information management is responsible for IT governance. The IT service provider can be an internal department. IT manager in SMEs also deal with operational task (strategic tasks), a company belonging to the corporate group or an external provider.

2 *IT strategy and planning*

The IT strategy and planning in SMEs describes the desired target state of the company with regard to its IT equipment. Using mixed strategies performed better than using stand alone strategies on the performance in SMEs (Oyedjo, 2012). The IT strategy is an action plan listing the responsibilities of the IT department and specifying dates of completion for the involved function department. The IT strategy should include the following questions (Albayrak and Gadatseh, 2012).

- *Hardware*

  What kind of hardware will be used in further, and for which tasks?

  In hardware purchased, are there rental agreements, or is there a total or partial outsourcing?

  Which external companies take care of the hardware?

- *Software*

  What kind of software will be used in the feature, and for which tasks?

  Who in IT department looks after the software, or which external service provider does so?

  What software is being developed in-house or by external service providers?

  Which standard software is used?

- *Services*

  What services does the IT department provide? (for example, advice, operation of applications, or management of IT uses?)

- *Process*

  How are projects implemented?

  How is work processes documented?

- *Operation*

  Which process types are used? (Core processes, management process and support process)

- *Outsource*

  What outsources is used?

  How to select the external partner?

Summary the thematic areas and instruments of IT strategy in SMEs showed as Table 2.

3 *IT Evaluation*

The usually key performance indicator (KPI) systems based on business intelligence applications are often only partially suitable for SMEs. Therefore, the IT balanced scorecard (BSC) (Kaplan and Norton, 2000) has become established for the operational control of the IT strategy. The BSC is a strategy performance management tool – a semi-standard structured report, supported by proven design methods and automation tools that can be used by managers to keep track of the execution of activities by the staff within their control and to monitor the consequences arising from these actions. Every measurement of the IT scorecard has to be planned and constantly monitored within the framework of budgeting. For example, in new project (warehouse logistics), the planning of measures within the IT budget included planned costs, actual costs, target costs, and deviation of target and actual costs,

4 *IT operation*

An IT operations manager will be needed to take overall responsibility for all of the IT operations management activities. He will ensure that all day-to-day operational activities are carried out in a timely and reliable way.

a businesses executives and IT executives together make IT decisions

b IT executives process IT standard operating procedures to executive IT activities

c business executives makes decision on IT investment

d cost effective use of IT

e effective of IT for asset utilisation.

5 *IT governance communication practice*

IT steering committees represent a governance mechanism frequently applied to ensure the alignment of IT investments with business priorities and to otherwise provide oversight of organisations' IT – related activities (Huang et al., 2009).

a number of communication channels used to communicate IT governance polices, guideline and practices throughout the SME

b active participation of executive managers in formal IT steering committees

c senior management, categorised as corporate senior managers, division senior manager or both, having regular interactions with the CIO.

5 The implementation processes of IT governance framework

1 *Organisation management*

- *Communicate management support and policies*

  The control objective was implemented by developing an information security policy document. The document was approved by management and communicated to all employees.

- *Maintain application software*

  Change management procedures were set up to handle requests for changes to applications. The related information security controls are change control procedures and separation of development and operational facilities.

- *Manage user accounts and the access right*

  Procedures were developed for the creation, modification and termination of user accounts and related user privileges. Password and logon privileges were also created. The related information security controls are assess control policy, user registration, removal of access rights, review of user access rights, password use, unattended equipment and service logon procedure.

2 *Information security*

- *Ensure physical security*

  Physical security measures were implemented to secure the physical IT assets. The servers were placed in a designed server room with no external windows, air-conditioning and fire extinguishers. The related information security control is equipment sitting and protection.

- *Established security plan*

  An IT security plan was established. Most of the issues were already addressed in the implemented security polices.

- *Provide virus and spyware protection*

  Up-to-date anti-virus and anti-spyware software were already present.

- *Provide network security*

  A firewall was already in place to authorise access and control information flow from and to the network.

- *Ensure IT continuity*

  The IT Company already had an IT contingency plan and stored backup tapes off site. Quarterly tests were scheduled and UPS was purchased.

- *Manage data and backups*

  The company already performed daily backups. Regular backup media tests were scheduled. The related information security control is information backup.

3 *IT strategy and plan*

- *Provide IT governance*

  The IT governance framework was aligned with overall enterprise governance, and management defined the company's appetite for IT risk.

- *Define IT strategy*

  Management defined on IT strategy that defines how IT goals will contribute the business's strategy objectives and created tactical IT plans that are derived from the IT strategic plan.

- *IT planning*

  Management and IT analysed available technologies to plan which technological direction is appropriate to realise the defined IT strategy and create business opportunity.

- *Manage IT budget*

  The collection of IT resource was prioritised and an IT budget reflecting those priorities and the current operating costs were prepared.

4 *Monitor performance*

- *Monitor IT solution performance*

  Procedures were put in place to continuously monitor the performance and capacity of IT resources and to conduct performance and capacity forecasting of IT resource at right interval to minimise the risk of source disruptions due to insufficient or performance degradation.

- *Maintain technology infrastructure*

  Procedures were implemented to monitor and maintain the technology infrastructure. The related information security controls are inventory of assets, equipment maintenance, system monitoring and fault logging and control of technical vulnerabilities.

- *Monitor IT performance*

  A BSC was created that records targets, captures measurements and provides an all-round view of IT performance.

Table 3 An integrated IT governance implementation framework

	Tactics	*Mechanism*	*Relative mechanism*	*Implementation tools*
Strategic management	• IT executive and account • Committees and councils • CIO • IT governance managers • IT relationship managers	• Strategic IT decision-making • Strategic IT monitoring • Strategic information systems planning • IT executive councils	• Stakeholder participation • Business /IT participation • Customer/IT participation	• Strategic management • SWOT analysis
Process management	• Roles and responsibilities • IT organisation structure • Strategic Information system planning • IT security management	• Balanced scorecards • Information economics • Service level agreements • COBIT and ITIL • IT alignment/ governance maturity models	• Active participation by principle stakeholders • Collaboration between principal stakeholders • Partnership rewards and incentives	• Balanced scorecard analysis • Critical success factors analysis • Scenario analysis • Service level agreement • Programme management • E-transaction system
Value delivery	• Portfolio management: • Incident management • Change management	• IT change system • IT delivery management • IT benefit management • Cross-functional business/IT training and job rotation • Business//IT collocation	• Active participation by key stakeholders • Shared understanding of business/IT objective • Active conflict resolution • Portfolio management	• E commerce advisory board • ECRM task force • ROI and ROA • e-competence market • Corporative governance system

Table 3 An integrated IT governance implementation framework (continued)

	Tactics	*Mechanism*	*Relative mechanism*	*Implementation tools*
Risk management	• Disaster recovery plan • Security management • Audit Planning • Incident management process	• COBIT and CMMI • ISO/ICE 38500 • Project visibility and control	• Risk oriented audit programme • Audit division • Information technology service group	• Security measure and related development process
Performance measurement	• Performance monitoring: • IT performance tracking • Shard IT performance database • Project visibility and control	• COBIT • Productivity enhancement • Profitability improvement, cost reduction • Competitive advantage • Creation, inventory reduction	• IT service efficiency • Effective mutual fund investment	• KPI • Configuration management • Balanced scorecard analysis • Cost/ benefit/risk analysis • Benchmarking

The focus of IT governance implementation seems to be on five areas (Fletcher, 2006). The five focus areas are:

1 strategic management

2 process management

3 value delivery

4 risk management

5 performance management.

IT governance is implementing through tactics, mechanism, relative mechanism, and implement tools in the context of these five areas. Tactics like steering stirring committees are used to involve business decision makers in strategic level IT decision making. Relational mechanism includes shared learning and organisational division, and ensuring proper communications at all times. Mechanism involve management standard (e.g., COBIT, ITIL and ISO/IEC 38500) which can provide the IS organisation with the means of examining its activities and its value to business. Table 3 is denoted as an integrated IT governance implementation framework.

6 Case study

6.1 IT governance in X manufacturing company

X manufacturing company is a traditional industry in Taiwan and have 258 employees. The X Company undertakes strategic information system (IS) planning. The priority areas addressed by the strategic IS include IT architecture and standards, service delivery, technology for flexible teaching and learning, web portals, electronic communications, security and costs. X manufacturing company has primarily used COBIT to evaluate and improve key IT process. COBIT has been adopted as the best practice framework for IT service management and all central IT staff has received some basic training on COBIT.

X Company established a single incident management process. A process of identifying critical system was start in 2005 and a disaster recovery plan is currently under development. A complete audit of PCs, domain name servers, IP addresses is also being conducted to gain an understanding of the physical environment in the event of a disaster. The disaster recovery plan outlines processes for recovering critical systems with 24 hours. The Information Technology Services Group charge the planning and management of the information operation and system, equipment, the establishment and management of system database and input/output information, security management of computer central office. As part of the central IT services desk project, it is planned the implement ITIL to handle change and incident management. The IT security manager has been trained in ISO-38500 and will additionally undertake the security management training programme provided by the developer of COBIT.

6.2 Summary of findings

The *Pros* of X-Company in IT governance implementation

1 There is reference to ISO-38500 in the management of IT governance infrastructure in the traditional industry. It offers an excellent framework for those developing or enhancing their organisation's security.

2 COBIT and CMMI best practices are adopt to manage the business activities in general, not only the technical aspects of IT governance infrastructure.

3 ITIL and ISO-38500 best practices are the technical framework to help the management of IT governance infrastructure, from the development to operations.

4 Business's vision and objectives are the reason for business to implement the IT governance. These frameworks are the starting point for IT governance structure and strategies, IT governance process and tools, IT activities, and business value of IT.

5 International standard ISO-38500 enables your organisation to establish a security process which systematically optimises your organisation's security to a definable level.

6 Most SMEs do not engage in strategic planning. But, X Company undertakes strategic Information System (IS) planning.

7 IT governance frameworks benefits of organisations in different ways, the benefits are measured according the individual company purpose of framework implementation. X Company lack measurement performance method. The best practices methodologies cascade through the entire organisation, increased creativity and unexpected ideas, the BSC helps align key performance measures with strategy at all levels of an organisation.

8 X Company lack ITIL as standard for service management.

7 Conclusions

This study described an IT governance standard (COBIT, ITIL, ISO/ICE 38500, and CMMI). Since SMEs have so many limitations in terms of cost and human resource investment, we used IT governance standard in order to identify possibly existing theories and artifacts regarding IT governance in SMEs. Finally, it proposes an integrated framework for IT governance.

The first stage to look at the different core elements of focus and related best practices attached to each from various frameworks. The implementation and management of IT governance are:

1 strategic management

2 process management

3 value *delivery*

4 Risk management

5 performance management.

Under the implementation management of IT governance in SMEs, we build an integrated IT governance implementation framework. This framework included Tactics, Tactics, Relative Mechanism, and Implementation Tools. A case study of a traditional industry in Taiwan is showing the implement of IT governance. Future research can focus on the IT process of each individual company to identify IT governance in SMEs. Due to different industry type and business infrastructure, different companies may have their own way of governing IT flows, IT decision makers and communication channels used. Therefore, future research may investigate common and company-type of IT governance in SMEs.

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