

Application of Risk Management Techniques towards Realization of Quality Higher Education

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ABSTRACT

The application of risk management as a component of governance and administration has not been fully embraced in training institutions. The stage at which the concept of risk management should be applied in the traditional management system is in doubt or unclear. There is renewed emphasis by quality management standards to apply this concept in all production and service processes, therefore embedding it in the traditional quality assurance activities. It should be incorporated in the entire organization, all its parts and levels, as well as specific activities. Every institution of higher learning faces internal and external factors that impact on its ability to meet its objectives and compromise on its mission and vision. These factors in this study are referred as risks, which can affect the organization positively or negatively. The risk factors range from academic, legal compliance, financial, operational, corporate and strategic risks. A generic criterion of risk assessment is derived as outlined in several studies and standards, where they are used to guide process of risk identification, analysis, evaluation and treatment. To achieve this, several assessment techniques are employed on documented data in quality management system manuals and risk registers as secondary data and also seeking primary data where information clarification is required. It is from this data that a risk score is generated for the risk identified and ranked based on its criticality. A risk matrix is then developed to define acceptability of the risks. The risk framework is used by an organization to determine its risk appetite, prioritize decisions of mitigating risks and ensure quality service provision. This study demonstrates how risk management tools can serve as decision framework towards provision of quality higher education.

Key words: *Risk Management, Institutional risk assessment, Risk management framework*

INTRODUCTION

Most organizations face challenging natural, political, socio-economic and cultural influences that make their operating environments uncertain. These influences may impact

on the extent to which objectives and goals of the organizations are met. The University is not immune from risks and is required that they also to manage risk. Risk based regulation has been promoted as an economically rational decision making instrument for managing the difficult trade-offs between competing priorities that are inherent in any regulatory activity (Rothstein *et al.*, 2006). The demand for the efficient use of taxpayer's money is an emerging trend and increasingly requiring institutions of higher learning such as colleges and universities to be accountable to stakeholders (Huber, 2011). "Risk management" refers collectively to the principles, framework and process for managing risks effectively, and "managing risks" refers to the application of these principles, framework and process to particular risks. (ISO-31000, 2009). It means that precautionary measures have to be done for risk minimization, avoidance, or prevention.

Unlike the traditional "silo-based" approach to corporate risk management, risk management enables firms to benefit from an integrated approach to managing risk that shifts the focus of the risk management function from primarily defensive to increasingly offensive and strategic (Liebenberg and Hoyt, 2003). It prioritizes activities and events according to their impact and probability, which, in turn, should improve the efficiency and accountability of decision-making (Huber, 2011). Risk Management is not a process for avoiding risk. When used well, it can actively encourage an institution to take on activities that have a higher level of risk, because the risks have been identified and are being well managed, so the exposure to risk is both understood and acceptable. For this reason observers imply that before risk management solutions can be developed, the current drivers of risk must be identified and then evaluated (Sabri, Awad and Al-Zaytoonah, 2009). The International Risk Management Standard AS/NZS ISO 31000:2009 provides that the success of risk management will depend on the effectiveness of the management framework providing the foundations and arrangements that will embed it throughout the organization at all levels. Corporate governance, internal control and risk management are interdependent, probably as a means of creating trust to customers and ensuring quality products and services.

Successful risk management allows for safer business operations in terms of assets, activities and finance protection, as well as improvement of the services it offers. Thus, a company acquires a greater reputation and trust of its clients (Ruzic-Dimitrijevic, Dakic, 2014). The process of risk management therefore facilitates decision-making. Conceptually, ISO 31000 provides a more useful roadmap to establish a risk management framework because it looks at the complementarity between risk management, quality assurance and quality control processes. Risk management works when integrating all aspects of the internal environment to meet the demands of the external environment. Risk management is increasingly seen as a means of improving the likelihood of success in complex projects.

There is a gap, concerning studies done to legitimize the application of risk management in universities and colleges. Some of the studies done have identified several categories as briefly discussed below. The categories are academic risks, financial risks, reputational risks, strategic risks and operational risks. Academic risks are related to the learning processes

from admission, training evaluation internship to graduation. Financial risks involve income and expenditure and how to manage them. Strategies include risks affecting the ability of the institutions to achieve their planned goals under socio-political and economic environment. Operation risks relate to the day-to-day operations of the organization, human resource and planning aspects and sometimes includes all functional areas of the organization. Reputational risks may arise as a result of the institutions inability to efficiently manage all the other types of risks. The first approach is the organization's ability to define its context and external and internal environment of its operation (Toma, Alexa, and Sarpe, 2014). The risks faced by universities are diverse and the potential to incur losses as a result of risks is enormous. Risk managers must be vigilant in protecting the organization's assets from both direct and indirect potential losses. By developing and implementing a comprehensive risk management plan, a university will hold a dynamic tool that can serve as a road map for identifying and managing risk exposures (Bubka and Coderre, 2010). The risk management process is discussed below to shed light on how it may be applied in higher education setting.

Risk Management process

Several studies have tried to stipulate a number of approaches for risk management, but most of them follow the similar pattern (Cohrssen and Covello, 1989) of identification of hazards; risk estimation; communicating the significance of a risk; establishing recommendations and planning actions; measuring the effects of the new implemented actions; and, repeating the actions/cycle (Kumamoto, Hiromitsu, Henley, Ernest J, 1996). For the purpose of this study the steps used in the ISO-31000, 2009 were used so avoid ambiguity of differing approaches. The strength of the standard approach is its acceptable validity across different environments by giving comparable results, though the standard approach has some limitations; such as being more qualitative and less quantitative and not being statistical enough.

The risk management process follows the procedure shown in Figure 1 below. The five step process employs different data collection and analysis techniques referred to as risk assessment techniques discussed in the sub-section below.

The criteria necessary for applying specific risk assessment techniques are derived taking into account intrinsic organizational competencies necessary for deploying specific techniques. Moreover, the derived criteria are linked, on one hand, to the techniques, and on the other hand to the risk assessment process outlined in the ISO 31000:2009 standard (Chemweno *et al.*, 2015).

To guide on the choice of techniques, the ISO/IEC 31010 standard for risk assessment techniques propose several attributes necessary for applying generic risk assessment techniques (International Electrotechnical Commission, 2009). Table 1, gives a general guidance of some of the techniques that are applicable on risk assessment, more so limited to their applicability on this study.

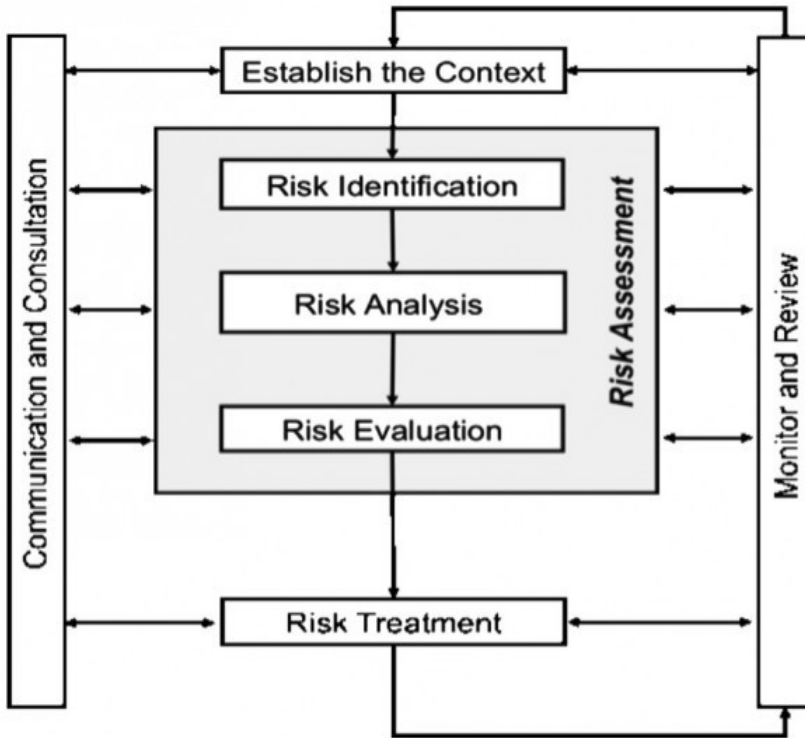


Figure 1. Risk Management process (ISO-31000, 2009)

Table 1: Risk Assessment Techniques

Risk Assessment Techniques	
Broad Category	Assessment Technique
Look up methods	Checklist
	Preliminary Hazard Analysis (PHA)
Supporting Methods	Structured interview and brainstorming
	Structured What If Technique SWIFT
	Human Reliability Analysis
Scenario Analysis	Root Cause Analysis (RCA)
	Cause and Consequence Analysis
	Cause and Effect analysis
	Business Impact Analysis
	Scenario Analysis
Control Assessment	Layers of Protection Analysis
	Bow tie analysis
Statistical Methods	Markov Analysis
	Monte-Carlo Analysis
	Bayesian Analysis

An organization should apply risk identification tools and techniques that are suited to its objectives and capabilities, and to the risks faced. Relevant and up-to-date information is

important in identifying risks. This should include appropriate background information where possible. People with appropriate knowledge and information concerning the area of risk assessment should be involved in identifying and analyzing risks.

Risk Management steps

The process of risk management follows the steps discussed below, always with minor variations depending on the field of study, the type of input data available, analysis methods employed and the format of output data required. The beauty of the process is that the output of one step of the process becomes the input of the succeeding step, even where the cycle is repeated after risk treatment. The process of risk management involves the following steps:

- a. Establish the context by identifying the objectives of the project, event or relationship and then consider the internal and external parameters within which the risk must be managed. Establishing the context sets the framework within which the risk assessment should be undertaken ensures the reasons for carrying out the risk assessment are clearly known, and provides the backdrop of circumstances against which risks can be identified and assessed. This is done through brainstorming, consultation and experts' opinion.
- b. Risk assessment or risk impact assessment, involves assessing the probabilities and consequences of risk events if they are realized. The results of this assessment are then used to prioritize risks to establish a most-to-least-critical importance ranking. Ranking risks in terms of their criticality or importance provides insights to the project's management on where resources may be needed to manage or mitigate the realization of high probability/high consequence risk events (Mitre.org, 2017). Risk assessment comprises three sub-processes namely; risk identification, risk analysis and risk evaluation.
 - i. **Risk identification:** This involves identifying the risks that might have an impact on the objectives of the University, School, department, campus or entity. This is done by identifying potential hazards in the processes and events under study and from the hazards, risks are identified. Involves identifying sources of risk, areas of impact, events and their causes and consequences.
 - ii. **Risk analysis:** This is the systematic use of available information on the identified hazards to estimate the risk (ISO, 14971). Here the analyst determines the consequences and probabilities of the risks identified, taking into account the presence or absence of effective controls measures.
 - iii. **Risk evaluation:** This is the process of comparing the estimated risk against given risk criteria to determine the acceptability of that risk (ISO-31000, 2009). Risk evaluation assists in the decision about risk treatment. In an organization, decisions have to be made about acceptability of a risk. A risk assessor can use the recently estimated risks and evaluate them using the criteria for risk acceptability

defined in the risk management plan. Then the risks can be screened to determine which ones need to be reduced

- d. Risk treatment: This is the process used to modify risk. It involves: avoiding the risk by deciding not to start or continue with the activity that gives rise to the risk; taking or increasing risk in order to pursue an opportunity; removing the risk source; changing the likelihood; changing the consequences; sharing the risk with another party or parties (including contracts and risk financing); and retaining the risk by informed decision (ISO-31000, 2009). It involves selecting and agreeing on one or more relevant options for changing the probability of occurrence, the effect of risks, or both, and implementing these options. This is followed by a cyclical process of reassessing the new level of risk, with a view to determining its tolerability against the criteria previously set, in order to decide whether further treatment is required (ISO/IEC-31010, 2009).

During the implementation of the steps, monitoring and review of treatments applied should be constantly communicated to the authorities of the organization because they form part of the decision making process and resource allocation. The methodology employed is discussed below.

METHODOLOGY

The study followed a methodology concept shown in Figure 1. To identify the risks, secondary data from documented procedure of every operation from a university was used to identify potential hazards and their related risks defined. These documents are risk registers, context documents and ISO procedure manual. The root cause of each risk, its impact and analysis of the same was also determined. It is important to note that some of the risks featured on processes across different activities and thus were merged together. Table 2 shows the categories of risks and a sample identified risks under each category.

Table 2: Categories of risks and examples of related risks

	CATEGORY OF RISK	RISK DESCRIPTION
1	Corporate Risks	Low student enrolment
		Constantly Changing technology
		Poor customer perception
		Poor Complaints handling
		Poor communication flow in the organization
		Students unrest

	CATEGORY OF RISK	RISK DESCRIPTION
2	Financial Risks	Inadequate Financial resources
		Forgery and falsification of documents
		Investment risks
		Financial impropriety
		Liquidity risk
3	Health risks	Undeveloped sports fields.
		Environmental risks
		Lack of specialized medical services
		Water borne diseases/ poor hygiene
4	HR risks	Inadequate qualifications of employed staff
		Labour turnover
		Inadequate staff
		Limited technical skills
5	Information Safety risks	intellectual property theft
		Inadequate safety of documents and records
		Loss of electronic data
6	Infrastructural risks	Inadequate Infrastructural resources
7	Integrity risks	Unscrupulous fundraising
		Swindling, Fraud and theft by staff
		Non-confidentiality (Examinations and documents)
8	Legal compliance risks	Encroachment of Institutional land
		Noncompliance to CUE standards
		civil suits on civil and contractual liability
		Legal compliance risks
9	Operational risks	Delays of official schedules
		Failure to meet performance targets
		Delayed graduation of Postgraduate students
		Credit risk
		Inaccurate measurements and Weights
10	Physical resources risks	Inadequate and inappropriately located office
		Loss of physical assets
11	Research Risks	Low uptake of Research funds & publications
12	Safety risks	Lack of safety

	CATEGORY OF RISK	RISK DESCRIPTION
13	Strategic risks	Lack of venture capitalists to finance innovations
14	Training risks	Low lecture attendance of staff and students
		Inadequate competency of full time and part-time lecturers,

Risk analysis was carried out on the risks identified in Table 2 by first determining the probability of the risk occurring based on a 5 scale criteria as indicated in Table 2, and then the impact or severity of the risk determined through brainstorming and expert opinion of the risk owner. The product of the probability of occurrence and the impact gives the risk level /Risk index as indicated by the formula below:

$$\text{Risk Level} = \text{Probability of Occurrence} \times \text{Impact}$$

A 5x5 risk matrix was generated and formed the criteria of risk acceptability of each identified risk as shown in Table 3 below.

Acceptability Criteria

The risk acceptability criteria was determined through consultation with the risk owners and agreed so as to form the decision making guide of the risks that fall within the acceptable regions or otherwise.

- a. Acceptable: Any risk score below 5 was considered safe and thus acceptable (approximately 20%). At this point, when a risk is accepted, a conscious decision is made not to take any action. This option is frequently accompanied by a contingency plan for dealing with the impact that will arise if the risk is realized. Sometimes some action is taken to lessen or minimize its likelihood and/or potential impact.
- b. As Low as Reasonably Possible (ALARP): was acceptable provided mitigation measures are present to reduce to ALARP level. It is a level between a score of 5 and 12, (approximately 50%). Sometimes the risks in these regions require conscious effort to mitigate against their potential impact. Some of the mitigating measures include transferring the risk to another organization on contractual basis;
- c. Unacceptable: Any risk score above 12 was considered unacceptable, and should be prioritized for mitigation.

Developing risk mitigation strategy is part of the risk treatment process, and it was done by identifying and putting the control measures in place, then determining mitigation measures that can reduce the risks.

Table 3: Risk Score matrix

IMPACT PROBABILITY	1 NEGLECTIBLE	2 MINOR	3 SERIOUS	4 CRITICAL	5 CATASTROPHIC
5 FREQUENT	5	10	15	20	25
4 PROBABLE	4	8	12	18	20
3 OCCASIONAL	3	6	9	12	15
2 REMOTE	2	4	6	8	10
1 NEGLECTIBLE	1	2	3	4	5

KEY

	ACCEPTABLE
	AS LOW AS REASONABLY POSSIBLE (ALARP)
	UNACCEPTABLE

RESULTS AND DISCUSSIONS

The results of the process were recorded in a risk management framework for ease of analysis and interpretation as shown in Table 4.

Table 4: Risk Management framework

CATEGORIZATION	RISK DESCRIPTION	POTENTIAL CAUSES	IMPACT ON THE SYSTEM	PROBABILITY OF OCCURRENCE (O)	IMPACT (S)	RISK LEVEL (O x S)	EXISTING CONTROLS MEASURES	MITIGATION STRATEGY

Risk Identification

During risk identification specific procedures and processes in the source documents were looked at, and a potential hazard was identified. Several potential hazards gave rise to a potential risk that was recorded. The root cause analysis of the risk was discussed with the process owner in this case a risk owner to bring out the factors that may cause the risks. The best approach to this was following event tree analysis, by asking oral questions from the major event to sub events that cause the risk event. From the risk description and potential causes the impacts of the risk on the system was determined and recorded.

Risk Analysis

The risks analysis process was done by determining the probability of occurrence of the identified risk. In a scale of 5 the risk was categorized as either being negligible, remote, occasional, probable or frequent and recorded in the risk framework. The impact or consequence of the risk was also determined in a scale of 5 for either being negligible to catastrophic. The product of the probability of occurrence and impact was recorded as risk level or risk score to be used in risk evaluation.

Risk evaluation

The data on the risk score was ranked to determine the levels of risk that require immediate attention. In reference to the risk score matrix in Table 2, and evaluation criteria, the risks were categorized as either unacceptable, ALARP, or acceptable as shown in Figure 2.

A total of 42 major risks were identified by the study, 12 of which fell in the *Unacceptable* category, 29 in the ALARP region and only one in the *acceptable* region. The risks in the unacceptable region are required to be prioritized and mitigation measure put in place to control the risk from becoming a catastrophe. With the process owner, it was possible to discuss the mitigation measures that can be used to control the risk. In the ALARP region of between risk score of 5 and 12, the risks were acceptable but measures were recommended to reduce them to lower figure. It is important to note that some of these risks have potential to rise to the unacceptable region if risk treatment is not done.

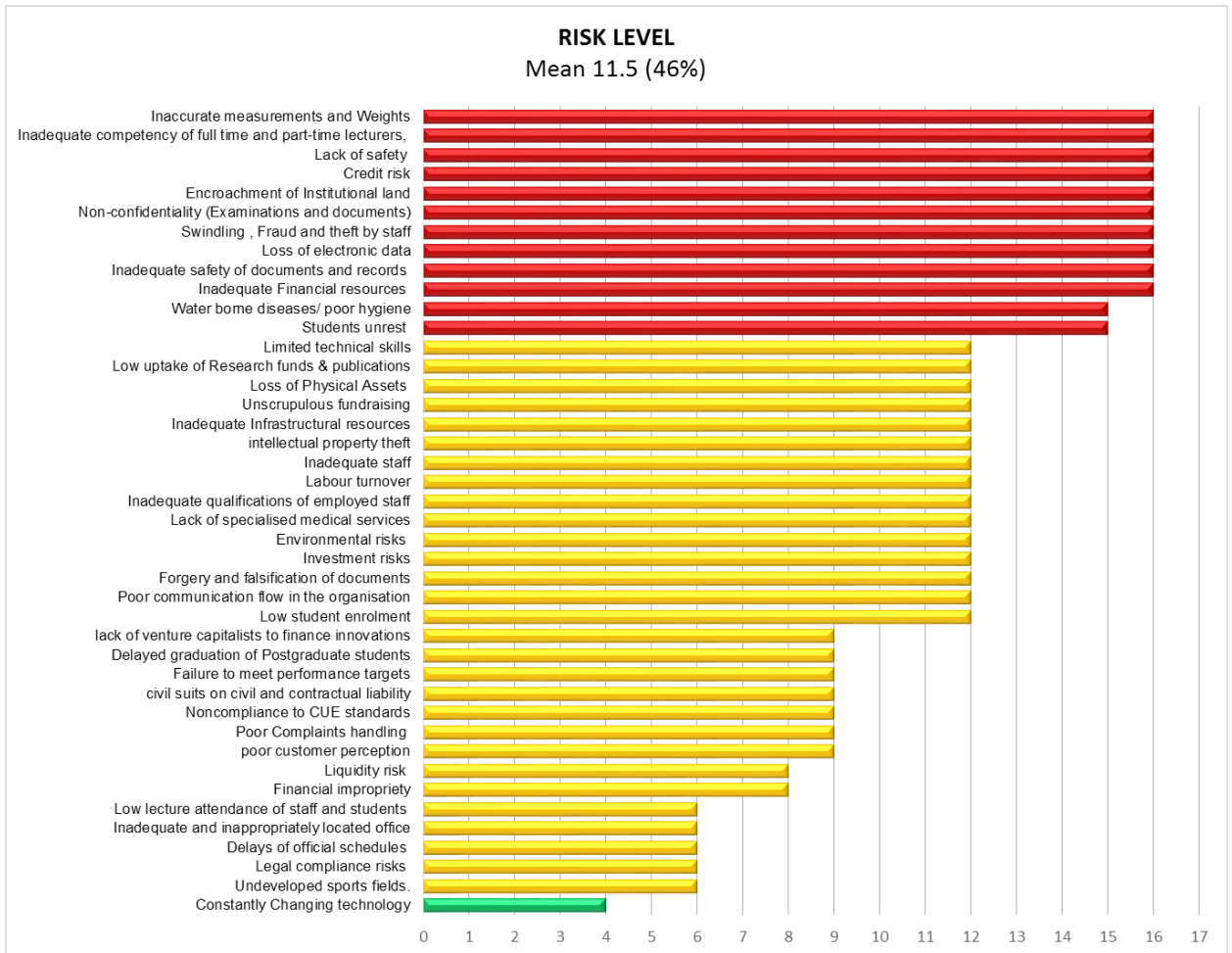


Figure 2. Risk score level

To give a general view of the risks, the results were categorized broadly to determine the categories of risks that require immediate action. Figure 3, shows the ranking of risk scores in broad categories of risk. It is prudent to note that, the highest ranked risks are safety, information security and integrity related at 64%, 59% and 59%_respectively. Information security risks range from risk of loss of records and documents, intellectual property theft and loss of electronic data. Integrity risks are: unauthorized fundraising, fraud, theft by staff, misrepresentation and non-confidentiality. The lowest ranked category is strategic risks.

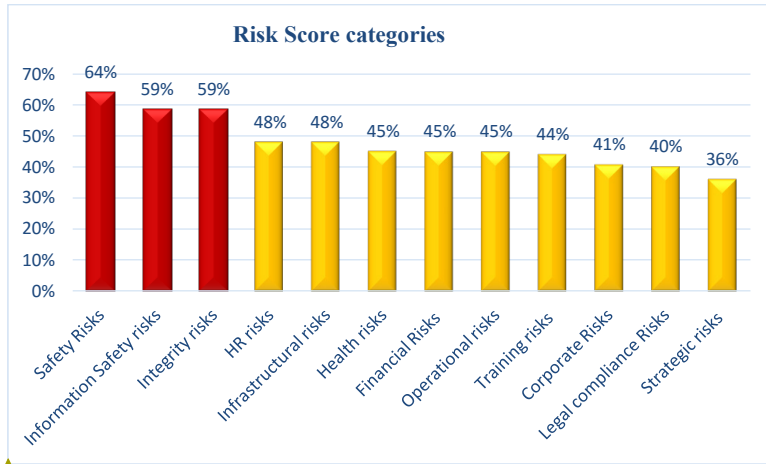


Figure 3. Risk Score categories

CONCLUSIONS

From the results of this study, it can be concluded that the risk management process can be integrated to the quality management process of any institution of higher learning. It is good to note that the analysis process is rather lengthy and takes time to identify, analyse and evaluate each individual process, where the raw results may not fit in the confines of this paper. The risk management process enumerated is clear enough to carry out similar representative analysis in any institution of higher learning.

The management of higher education institutions are committed to providing high-quality yet affordable education, while sustaining the financial health of their organizations. Often, they face severe budgetary pressures and increased threats to reputation and image of their institutions that may hinder ability to attract students, teaching staff and funding. It is thus important that they embrace risk management to ensure that they foresee some of the potential hazards and prepare for them before they occur. The study will serve as a baseline of further studies on risk based management process that is being emphasised by quality management systems.

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