Information Technology Governance for Tunisian Universities (ITG4TU)

561614-EPP-1-2015-1-ES-EPPKA2-CBHE-JP

Co-funded by the
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Meeting minutes

FSEGS, University of Sfax, Sfax, Tunisia
06 September 2016

ITG4TU CONSORTIUM

AMENDMENT HISTORY

Version	Revision	Date	Author	Modification
1	0	06Sept16	Slim Kallel	First version of the document
1	1	07Sept16	Ismail Bouassida	Minor changes
1	2	07Sept16	Slim Kallel	Minor changes

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1. Attendants

- Dr. Ismail Bouassida, member of the ITG4TU Team
- Dr. Slim Kallel, member of the ITG4TU Team
- Prof. Ahmed Hadj Kacem, Dean
- Dr. Chafik Aloulou, member of the ITG Committee
- Dr. Bilel Gargouri, member of the ITG Committee
- Dr. Hatem Hadj Kacem, member of the ITG Committee

2. Agenda

2.1.Presentation of the best practices sheet

Dr. Ismail Bouassida, as coordinator of the project in the University of Sfax, presented the best practices sheet. He introduces the best practices related to each principle: Responsibility, strategy, acquisition, performance, conformance, and human behaviors. He also presented the main issue, which is the adequacy of the presented best practices to the faculty context.

The attendants discussed in detail all questions related to the best practices of each principle. The ITG committee members appreciate these principles.

Prof. Ahmed Hadj Kacem, as the dean of the faculty of Economics and management of Sfax, explained that these principles are the keys to the good governance of the faculty.

Conclusion: The participants confirmed that these practices are adequate to the context of the faculty.

3. Annexe: Best practices sheet

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Responsibility Consensus

Answer Yes (Y) or No (N) or leave it blank if you don´t know

Governance Team (GT) responsability	
RE1	Does the University's Governance Team (GT) regularly review which IT assets should be monitored centrally and which should be delegated?
RE2	Does the GT team actively direct the strategic planning of IT in the university
RC1	How many times per year do IT governance decisions appear on the GT schedule?
IT Governance	
RE3	Is the GT aware of the importance of IT Governance?
RE4	Has the GT promoted actions (training, communication, etc.) to disseminate in the university community the importance of proper IT governance?
RE5	Is it understood that IT Governance is the responsibility of the GT and not of IT experts and professionals?
RE6	Has the GT chosen the model of IT governance that it wishes to implement and has this been communicated to, understood by and supported by all relevant groups in the university?
RE7	Has the GT designed and funded a project to implement an IT governance system in the university?
RC2	What is the amount of funding assigned to the project for the implementation of an IT governance system this year?
RE8	Has the GT identified the roles and responsibilities related to IT governance and strategy and have these been assigned to individuals and committees?
RE9	Does the GT regularly review the effectiveness of IT governance processes?
Chief Information Officer	
RE10	Has the GT assigned the responsibility of directing the management of IT and of working together with the GT in preparing the IT strategy and governance to a CIO?
RE11	When appointing the CIO, did the GT bear in mind that this person should be an experienced and skilled governor with excellent communication skills?
RE12	Does the CIO form part of the university's Governance Team (GT) and take part in making governance decisions?
RE13	Does the CIO take part in preparing the university's strategic plans (whether these are IT-related or otherwise)?

Committees	
RE14	Has the GT set up an IT Strategy Committee in which the CIO and other GT members participate and that designs and monitors IT strategy and governance?
RC3	How many times per year does the IT Strategy Committee meet?
RE15	Has the GT set up an IT Steering Committee directed by the CIO that coordinates IT projects and reviews the management of IT operations?
RE16	Do all members of the university community that have something to say as either those in charge of IT services or as IT service users participate in the IT Steering Committee?
RC4	How many times per year does the IT Steering Committee meet?
Assigning responsabilities	
RE17	Has the GT established a model for making IT-related decisions that determines who is responsible for providing the information and who must make the decisions based on this?
RE18	Has the GT drawn up a formal written procedure to ESTABLISH THE RESPONSIBILITIES and delegations related to IT strategy and governance?
RE19	Has the GT drawn up a formal written procedure to REVIEW THE RESPONSIBILITIES assigned and reassign them in accordance with IT strategy and governance requirements?
RE20	Has the GT instigated the preparation of a document that details the rights and duties of those who are delegated a responsibility?
RE21	Does the GT check that people who have been assigned a responsibility correctly perform their duties?
RE22	Has the GT redesigned the organisational structure so that this takes into account the responsibilities at all levels in the organisation, the committees and the roles pertaining to IT governance?
RE23	Does the GT have a clear vision of the responsibility of third parties in relation to the university's IT objectives?

Monitoring	
RE24	Are reports submitted on a regular basis to the GT which contain the values of the main indicators proposed in the university's strategic plan?
RE25	Does the university have a balanced scorecard?
RE26	Does the university have an IT balanced scorecard?
RE27	Does the university have a catalogue of indicators that serves to enable the GT to monitor whether the responsibilities related to the management of IT are performed correctly?
RE28	Does the university have a catalogue of indicators that serves to enable the GT to monitor whether the responsibilities related to the governance of IT are performed correctly?
RE29	Has the GT assigned a responsibility with the aim of maintaining a proactive attitude when analysing business intelligence and providing key information for GT decision making?

Strategy Consensus

Answer Yes (Y) or No (N) or leave it blank if you don´t know

Strategic Plan	
EE1	Has the GT instigated the design of an IT Strategic Plan that is aligned with the university's overall strategy?
EC1	Every how many months is the university's IT Strategic Plan rewritten?
EE2	Has the GT instigated the design of a strategic plan for the university that also includes IT strategies to ensure they both follow the same line?
EC2	Every how many months is the university's Strategic Plan rewritten?
EE3	Has the GT promoted a short-term and long-term study to determine the resources (financial, human, etc.) required to fulfil the IT strategic objectives?
IT policies	
EE4	Has the GT designed a set of IT policies, aligned with the university's strategy, that are a reference to guide those who have to make IT-related decisions in the university?
EE5	Has the GT promoted the proper communication of IT policies so that they are known, understood and observed by all the university community?
EE6	Has a procedure been designed to measure whether IT policies are known, understood and observed in the university?
EE7	Has the GT instigated a study that evaluates the different university stakeholders' satisfaction with the university's IT plans and policies?
EC3	Every how many months is the university's IT policy catalogue plan reviewed?
EC4	Every how many months is the university's IT policy catalogue contrasted with that of other universities?
IT Resources	
EE8	Does the GT plan IT acquisitions in a timely manner and are they included in the next year's budget?
EE9	Has the GT designed a long-term programme that has the aim of implementing all the IT developments that the university needs to meet its users' needs?
EE1	Does the GT know how many IT developments are still not integrated yet should be?

EE1 Has the GT designed medium-term IT infrastructure renewal plans to prevent this from becoming obsolete while at the same time incorporating emerging technologies?

IT innovation	
EE1.	Has the GT designed a policy that expresses the support for technological innovation on campus?
EE1.	Has the GT allocated a responsibility whose aim is to evaluate emerging technologies and plan their incorporation if they are suited to meeting the university's strategic needs?
EE1.	Has the GT promoted processes that enable the evaluation of emerging technologies and the planning of their incorporation if they are suitable for the institution?
EE1.	Has the GT devoted enough human and financial resources to ensure that the responsibility for technological innovation is carried out properly?
IT culture	
EE1.	Has the GT promoted a training plan for all the university’s stakeholders to promote the mastery of technologies and the awareness of their importance for the university?

Acquisition Consensus

Answer Yes (Y) or No (N) or leave it blank if you don´t know

IT investment	
AE1	Has the GT set up a procedure to clearly and accurately measure how much the university spends on IT on an annual basis?
AE2	Does the university have a single centralised cost centre to carry out the university's main IT investments?
AE3	Has the GT designed multi-annual investment programmes that guarantee the funding and execution of large-scale IT projects?
AE4	Has the GT instigated a study that determines the university's IT assets?
Acquisitions policy	
AE5	Has the GT designed and published a policy that provides guidance on different types of acquisitions?
AE6	Has the GT promoted the design of an IT purchase procedure that includes the analysis of the different offers based on strategic objectives and not only on technical or economic criteria?
AE7	Has the GT promoted a study that evaluates the satisfaction of various stakeholders with the policies and procedures related to IT acquisitions?
AE8	Has the GT designed and published a policy that provides guidance on different types of supplier relationships?
AE9	Does the university optimise its purchases using good practices (for example, purchasing consortia, discount negotiations, purchase of special offers, etc.)?
AE1(	Is cost accounting performed to establish the cost impact of each IT service in respect to all purchase costs, maintenance costs and other applicable costs?
Suppliers	
AE1'	Has the GT designed and published a policy that provides guidance on different types of supplier relationships?
AE12	Have service level agreements been set up with all IT suppliers?
AE13	Are reports submitted to the GT that monitor the service levels agreed with suppliers?
AE14	Has the GT designed and published a policy that reflects its stance in relation to the outsourcing of services?
AE15	Has the GT promoted a study on the feasibility of externalising various services and does this study should encompass both the benefits and the risks for the university?

AC1	Every how many months does the GT review the performance of outsourced IT services and determine their continuity?
IT projects	
AE1(	Has the GT decided to establish a “portfolio of projects” as a methodology to carry out the planning of IT acquisitions aligned with the university’s strategic objectives?
AC2	Every how many months is a call launched to establish the “portfolio of projects”?
AE1	Does the GT regularly publish the objectives of IT projects that are to be implemented?
AE1(	Has a template been created for IT projects which includes all important information (aims, benefits, steps to follow, performance criteria and associated risks) and that requires that the GT establish their order of completion?
AE1(	When calculating the costs of an IT project, are the IT investment and maintenance costs, human resource costs, training costs and the costs of organisational changes stemming from the project all taken into account?
AE2(	Does the template for the creation of IT projects include the criteria necessary to regularly evaluate the continuity or termination of the service or the withdrawal of an IT system in order to make decisions thereon?
AE2	When calculating the cost of an IT project, do these include the costs required to maintain the continuity of an IT-based service?
AE2(	When calculating the cost of an IT project, do these include the design of activities and the costs necessary to train all the people involved in that project so that maximum IT performance is obtained and the services offered are improved?
IT acquisitions and projects priority	
AE2(	Has the GT designed and published a set of criteria aligned with the strategic objectives which determines the priority of IT acquisitions and projects?
AE2	When making an IT acquisition, does the evaluation criteria include the fact that the proposed equipment should be compatible with existing technologies, comply with standards and be flexible and adaptable for future changes that may occur within the university?
AE2(	Has the GT designed and published an IT acquisition approval protocol that details all the people responsible for supplying information and making decisions?
AE2(	Does the GT have the ultimate responsibility for IT projects that are going to be implemented (both those that are centralised and delegated) and decide their priorities in such a way that a large portion of resources are channelled to the most important projects?

IT projects results	
AE2	Has a procedure been designed to continuously monitor IT projects and services in operation with a view to determining their performance, redesigning them, if necessary, and to continually seek cost savings?
AC3	Every how many months does the GT review the evolution of IT services and decide upon their continuity?
AE2	Does the GT know what percentage of IT projects are to be completed in time and with the planned resources?
AE2	Has the GT promoted the drafting of a procedure to measure whether the results of the projects, once completed, have met the planned objectives?
AE3	When calculating the benefits of an IT project, are a wide range of aspects ranging from cost savings to user satisfaction measured?
AE3	Does the GT regularly publish the benefits obtained in the university as a result of the IT projects completed?
AC4	Every how many months does the GT publish a report that details the results of completed IT projects?
AE3	Has a procedure been designed to analyse the satisfaction of different user groups with the results of IT projects that have been completed and are now up and running?
Collaboration and comparison	
AE3	Has the GT designed a policy that determines whether it is a good idea to compare the results of IT projects with those of other universities and their subsequent communication to the university community and stakeholders?
AE3	Does the GT support initiatives aimed at exchanging experiences and collaborating with other universities?

Performance Consensus

Answer Yes (Y) or No (N) or leave it blank if you don´t know

Performance	
DE1	Has the GT designed and published a policy that reflects the expected performance of university processes that are IT-based?
DE2	Does the GT monitor whether the inefficient use of IT affects its performance and communicate the results to users so that they are aware of the need for correct usage?
DC1	Every how many months is a report sent to the GT that clearly states the performance level of IT services?
DC2	Every how many months is an internal audit carried out to check the performance of IT services in operation?
DC3	Every how many months is an external audit carried out to check the performance of IT services in operation?
DE3	Has the GT devoted enough resources to maintain a high level of satisfaction in user groups related to the service with regard to performance of IT-based services?
DE4	Does the GT analyse to what extent IT helps to reach the strategic goals of each university service?
IT services continuity	
DE5	Is the GT informed on the risks and security problems that may affect the continuity of services so that they can decide on an acceptable level of risk for the university?
DE6	Has a plan been designed that ensures the continuity and availability of IT-based university services?
DE7	Has a contingency plan been designed that contemplates the recovery of a service in the shortest time possible after a serious incident takes place?
Information availability and quality	
DE8	Has the GT prepared a report to determine what information it must receive to help it take decisions?
DE9	Has a procedure been designed that ensures that the GT receives the information it needs to help it take decisions?
DE10	Are security measures in place to maintain the integrity and quality of institutional information?
DE11	Has the GT allocated a responsibility for establishing an information structure and the intelligent analysis thereof from a strategic standpoint?

Service level agreements	
DE12	Does the GT regularly analyse the requirements of users (for example, employees and students)?
DE13	Does the university actively manage user expectations (for example, through service descriptions, service level agreements, etc.)?
DE14	Have service level agreements been set up with all IT service users?
DC4	Every how few months are service levels reviewed and checks carried out to see whether these deviate from those agreed with users?
DE15	In the event that deviations in service level agreements are identified, are corrective measures adopted?
DC5	Every how few months are corrective measures applied to non-compliant service levels?
DE16	Has the GT promoted the design of a procedure to analyse the satisfaction of various stakeholders with relation to the university's IT-based services in operation?

Conformance Consensus

Answer Yes (Y) or No (N) or leave it blank if you don´t know

Catalogues	
CE1	Has the GT officially assigned the responsibility of being aware of IT-related legislation to a person or a group of people?
CE2	Has a reference catalogue been compiled that contains the IT-related regulations and laws that affect the university and is this kept up to date?
CE3	Has the GT defined and published a catalogue with all kinds of IT-related policies to guide the rest of the university community on how to implement IT on campus?
CE4	Has the GT promoted the design and publication of a set of internal procedures and regulations that implement the previously defined IT policies?
CE5	Has the GT promoted processes to communicate IT-related internal policies and regulations to facilitate their dissemination in all spheres of the university community?
CE6	Is there a measurement to determine the level of knowledge concerning IT policies and laws in the university community?
conformance	
CE7	Has the GT assigned a person or a group the responsibility of monitoring whether a person or group complies with the regulations?
CC1	Every how many months does the GT review the skills of those in charge of ensuring the compliance of IT regulations in the university?
CE8	Are reports submitted to the GT that determine the level of compliance of internal procedures with external laws and policies?
CE9	
CC2	Every how many months does the GT evaluate whether IT governance processes are properly carried out in the university?
Audits	
CE10	Are those in charge of IT services and projects encouraged to take into account IT-related external regulations and laws and policies and internal procedures?
CE11	Are internal audits carried out to check whether IT projects and services comply with IT-related external laws and regulations and internal policies and procedures?
CC3	Every how many months is an internal audit carried out to check whether the regulations on IT projects and services are being observed?
CE12	Are external audits carried out to check whether IT projects and services comply with IT-related external laws and regulations and internal policies and procedures?
CC4	Every how many months is an external audit carried out to check whether the regulations on IT projects and services are being fulfilled?

CE13	Are reports submitted to the GT with the results of the internal and external audits, which clearly express the level of the university's level of compliance with regulations and the risks that these entail?
CC5	Every how many months is a report submitted to the GT that clearly expresses the university's level of compliance with regulations and the risks that these entail?
Standards	
CE14	Has the GT officially assigned to a person or group of people the responsibility of understanding the IT-related standards?
CE15	Has a reference catalogue been created that contains the IT-related standards applicable or already applied in the university and is this kept up to date?
CE16	Has the GT designed and disseminated a policy that promotes the general use of IT-related professional standards and best practices within the university?
CE17	Is IT management based on standard methodologies (for example ITIL or ISO 20000) carried out?
CE18	Is IT governance carried out on the basis of standards (ISO 38500, COBIT, etc)?
CE19	Are reports submitted to the GT that determine the level of uptake of IT standards in the university?

Human behaviour Consensus

Answer Yes (Y) or No (N) or leave it blank if you don´t know

Stakeholders	
HE1	Are the various stakeholders identified and is there official documentation on how each one will participate in new IT initiatives? (possible stakeholders: heads of university user services, heads of daily operations of each service, heads of IT maintenance, participants in the design and planning of IT projects, second-level managers and executives (heads of service and deputy vice-chancellors), university service users, suppliers, competitors, partners, those in charge of drafting laws and regulations and observers of university processes).
HE2	Are there different groupings of stakeholders so as to offer them different treatment when involving them in IT-supported change processes? (for example: grouping them based on their experience of IT use or forming groups according to age and level of responsibility, etc.)
HE3	Has the GT promoted the design of a procedure that serves to allow it to become aware of the IT-related needs and concerns of stakeholders affected by them?
Resistance to change	
HE4	Does the analysis identify risk factors arising from resistance to change in the people or groups affected and from a lack of commitment in those involved?
HE5	Does IT project planning include activities aimed at mitigating the risk related to a lack of commitment in participants?
HE6	Has a process been set into motion to raise awareness that leads to reducing people's resistance to an IT-based change process (information, training, etc.)?
HE7	Does IT project planning include the responsibilities assigned to all participants and activities aimed at measuring the extent to which the involvement of these people contributes to the success of the project and therefore to the change process that it promotes?
HE8	Have committees and work groups been created to facilitate the participation, and therefore the involvement, of stakeholders in the design, supervision and final evaluation of IT-based change processes?
HE9	Does IT project planning include a stage to train stakeholders on the change that is going to take place in the university service affected by the IT initiative?
HE10	Does IT project planning include a stage of cross training, training the heads of the university service in IT matters and technicians in the university process affected by the IT initiative?
People in the process	

HE11 Has a professional career structure been designed that reflects promotions based on the acquisition of skills (also IT) and on successes obtained during change processes?

HE12 Is there a procedure established to measure the level of skills (especially those related to IT) of individuals in different interest groups?

Workload	
HE13	Does the GT know what human resources are available, what occupational roles there are at all times and what human potential is available to undertake new IT initiatives, avoiding overloads?
HE14	Is there a procedure set up to measure the extent to which each IT project increases the workload of each individual or group participating and are there indicators that determine whether this is appropriate?

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FSEGS, University of Sfax, Sfax, Tunisia
28 September 2016

ITG4TU CONSORTIUM

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1	0	29Sept16	Slim Kallel	First version of the document
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1. Attendants

- Dr. Ismail Bouassida, member of the ITG4TU Team
- Dr. Slim Kallel, member of the ITG4TU Team
- Prof. Ahmed Hadj Kacem, member of the ITG4TU Team
- Ing. Ahmed Ben Arab, member of the ITG4TU Team

2. Agenda

2.1.Compilation the best practices sheet

Following the meeting with the ITG committee, the ITG4TU Team met to discuss the decision taken in the last meeting about the best practices. Dr. Ismail Bouassida, as coordinator of the project in the University of Sfax, proposes to contact the project coordinators of other involved Tunisian universities to share with them our decision and discuss their point of views on the adequacy of the best practices with the Tunisian context.

Conclusion: The project coordinator will meet the coordinators of the universities of Gabes, Tunis Elmanar, and Manouba.

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Meeting Minutes

ITG4TU Tunisian Partners, 04/10/2016

ITG4TU CONSORTIUM

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1	0		Mehdi Khouja	Initial Version
1	1		Ismael Bouassida	Minor changes

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1. Attendances

The ITG4TU Tunisian coordinators:

- Dr. Mehdi Khouja as coordinator form UGB
- Dr. Youssef Ben Halima as coordinator from UMA
- Dr. Samir Moalla as coordinator from UTM
- Dr. Ismael Bouassida as coordinator form US

2. Agenda

A meeting was held via skype on October 04th, 2016. In this meeting, the Tunisian coordinator discussed the adaptation of the ITG best practices for the Tunisian universities.

Adaptations on IT Governance Framework best practices

Each coordinator gave a feedback about the adequacy of the ITG best practices for his university. The discussion was focused on the best practices to include or exclude from the Tunisian ITG framework. The attendances agreed to adopt the same framework for the four Tunisian universities. The framework will consist on various best practices organised into six ITG principles.

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08 November 2016

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- Prof. Ahmed Hadj Kacem, member of the ITG4TU Team
- Ing. Ahmed Ben Arab, member of the ITG4TU Team

2. Agenda

2.1. Current situation of the best parctices

In this phase of the project, the current situation of the best practices should be identified. The ITG4TU Team identified four persons to separately fill in the best practices sheet. These persons are:

1. The dean
2. The IT engineer
3. The Head of the computer science department
4. Member of the scientific board of the faculty.

Conclusion: Four persons are solicited to complete the best practices sheet related to the best practices of the governance of our faculty.

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24 November 2016

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- Dr. Chafik Aloulou, member of the ITG Committee
- Dr. Bilel Gargouri, member of the ITG Committee
- Dr. Hatem Hadj Kacem, member of the ITG Committee
- Ing. Riadh Bouneb, IT Engineer in the faculty

2. Agenda

2.1.Presentation current situation of the best practices

During this meeting, the designated persons to fill the best practices sheet (the dean, the IT engineer, the head of the computer science department, one member of the scientific board of the faculty) were willing to present their opinion.

The other attendants intervene after each principle to present their point-of-view. In some case, they are disagreeing with the proposed opinions.

A consensus was reached after presenting the four opinions and the final version of the document was created.

Conclusion: This document of the current best practice is ready and needs to be sent to European ITG4TU team to have a first feedback. Some questions are also sent to the ITG4TU team.

3. Annexe: Current situation of the best practices

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Responsibility Consensus

Answer Yes (Y) or No (N) or leave it blank if you don´t know		1	2	3	FINAL
Governance Team (GT) responsability					
RE1	Does the University's Governance Team (GT) regularly review which IT assets should be monitored centrally and which should be delegated?	N	N	N	Y
RE2	Does the GT team actively direct the strategic planning of IT in the university	N	N	N	N
RC1	How many times per year do IT governance decisions appear on the GT schedule?	2	0		0
IT Governance					
RE3	Is the GT aware of the importance of IT Governance?	Y	N	Y	N
RE4	Has the GT promoted actions (training, communication, etc.) to disseminate in the university community the importance of proper IT governance?	Y	N	N	N
RE5	Is it understood that IT Governance is the responsibility of the GT and not of IT experts and professionals?	Y		N	N
RE6	Has the GT chosen the model of IT governance that it wishes to implement and has this been communicated to, understood by and supported by all relevant groups in the university?	N	N	N	N
RE7	Has the GT designed and funded a project to implement an IT governance system in the university?	N	Y	N	N
RC2	What is the amount of funding assigned to the project for the implementation of an IT governance system this year?	0			
RE8	Has the GT identified the roles and responsibilities related to IT governance and strategy and have these been assigned to individuals and committees?	N	Y	N	N
RE9	Does the GT regularly review the effectiveness of IT governance processes?	N	N	N	N
Chief Information Officer					
RE10	Has the GT assigned the responsibility of directing the management of IT and of working together with the GT in preparing the IT strategy and governance to a CIO?	N	N		N
RE11	When appointing the CIO, did the GT bear in mind that this person should be an experienced and skilled governor with excellent communication skills?		N		N
RE12	Does the CIO form part of the university's Governance Team (GT) and take part in making governance decisions?	N	N	N	N
RE13	Does the CIO take part in preparing the university's strategic plans (whether these are IT-related or otherwise)?		N	N	N

Committees					
RE14	Has the GT set up an IT Strategy Committee in which the CIO and other GT members participate and that designs and monitors IT strategy and governance?	N	N	N	N
RC3	How many times per year does the IT Strategy Committee meet?	0	0		
RE15	Has the GT set up an IT Steering Committee directed by the CIO that coordinates IT projects and reviews the management of IT operations?	N	N	N	N
RE16	Do all members of the university community that have something to say as either those in charge of IT services or as IT service users participate in the IT Steering Committee?	N			N
RC4	How many times per year does the IT Steering Committee meet?	0	0		
Assigning responsabilities					
RE17	Has the GT established a model for making IT-related decisions that determines who is responsible for providing the information and who must make the decisions based on this?	N	N	N	N
RE18	Has the GT drawn up a formal written procedure to ESTABLISH THE RESPONSIBILITIES and delegations related to IT strategy and governance?	N	N	N	N
RE19	Has the GT drawn up a formal written procedure to REVIEW THE RESPONSIBILITIES assigned and reassign them in accordance with IT strategy and governance requirements?	N	N	N	N
RE20	Has the GT instigated the preparation of a document that details the rights and duties of those who are delegated a responsibility?	N	N	N	N
RE21	Does the GT check that people who have been assigned a responsibility correctly perform their duties?	Y	Y	Y	N
RE22	Has the GT redesigned the organisational structure so that this takes into account the responsibilities at all levels in the organisation, the committees and the roles pertaining to IT governance?	N	N	N	N
RE23	Does the GT have a clear vision of the responsibility of third parties in relation to the university's IT objectives?	Y	N	Y	

Monitoring					
RE24	Are reports submitted on a regular basis to the GT which contain the values of the main indicators proposed in the university's strategic plan?	N	Y	N	N
RE25	Does the university have a balanced scorecard?		N	N	N
RE26	Does the university have an IT balanced scorecard?	N	N	N	N
RE27	Does the university have a catalogue of indicators that serves to enable the GT to monitor whether the responsibilities related to the management of IT are performed correctly?	N	N	Y	N
RE28	Does the university have a catalogue of indicators that serves to enable the GT to monitor whether the responsibilities related to the governance of IT are performed correctly?	N	N	N	N
RE29	Has the GT assigned a responsibility with the aim of maintaining a proactive attitude when analysing business intelligence and providing key information for GT decision making?	N	N	N	N
	NUMBER OF YES				1
	Total of Bpractices				29
	% Bpractices Satisfaced				3%

Strategy Consensus

Answer Yes (Y) or No (N) or leave it blank if you don´t know		1	2	3	4	FINAL
Strategic Plan						
EE1	Has the GT instigated the design of an IT Strategic Plan that is aligned with the university's overall strategy?	N	N	Y	N	N
EC1	Every how many months is the university's IT Strategic Plan rewritten?	0	0	N	0	0
EE2	Has the GT instigated the design of a strategic plan for the university that also includes IT strategies to ensure they both follow the same line?	N	N	N	N	N
EC2	Every how many months is the university's Strategic Plan rewritten?	0	0		0	0
EE3	Has the GT promoted a short-term and long-term study to determine the resources (financial, human, etc.) required to fulfil the IT strategic objectives?		Y	N	N	N
IT policies						
EE4	Has the GT designed a set of IT policies, aligned with the university's strategy, that are a reference to guide those who have to make IT-related decisions in the university?	N	N	N	N	N
EE5	Has the GT promoted the proper communication of IT policies so that they are known, understood and observed by all the university community?	N	N	Y	N	N
EE6	Has a procedure been designed to measure whether IT policies are known, understood and observed in the university?	N	N	N	N	N
EE7	Has the GT instigated a study that evaluates the different university stakeholders' satisfaction with the university's IT plans and policies?	N	Y	N	N	N
EC3	Every how many months is the university's IT policy catalogue plan reviewed?	0	0		0	0
EC4	Every how many months is the university's IT policy catalogue contrasted with that of other universities?	0	0		0	0
IT Resources						
EE8	Does the GT plan IT acquisitions in a timely manner and are they included in the next year's budget?	Y	Y	N	Y	Y
EE9	Has the GT designed a long-term programme that has the aim of implementing all the IT developments that the university needs to meet its users' needs?	N	N	N	N	N
EE1	Does the GT know how many IT developments are still not integrated yet should be?	N	N	Y	N	N

EE1	Has the GT designed medium-term IT infrastructure renewal plans to prevent this from becoming obsolete while at the same time incorporating emerging technologies?	N		Y	Y	Y

IT innovation						
EE1	Has the GT designed a policy that expresses the support for technological innovation on campus?	N	N	N	N	N
EE1	Has the GT allocated a responsibility whose aim is to evaluate emerging technologies and plan their incorporation if they are suited to meeting the university's strategic needs?	N	N	N	N	N
EE1	Has the GT promoted processes that enable the evaluation of emerging technologies and the planning of their incorporation if they are suitable for the institution?	N	N	Y	N	N
EE1	Has the GT devoted enough human and financial resources to ensure that the responsibility for technological innovation is carried out properly?	N	N	N	N	N
IT culture						
EE1	Has the GT promoted a training plan for all the university's stakeholders to promote the mastery of technologies and the awareness of their importance for the university?	N	Y	N	Y	N
		NUMBER OF YES			2	
		Total of Bpractices			16	
		% Bpractices Satisfa			13%	

Acquisition Consensus

Answer Yes (Y) or No (N) or leave it blank if you don´t know		1	2	3	FINAL
IT investment					
AE1	Has the GT set up a procedure to clearly and accurately measure how much the university spends on IT on an annual basis?	N	Y	Y	Y
AE2	Does the university have a single centralised cost centre to carry out the university's main IT investments?	N	Y	N	N
AE3	Has the GT designed multi-annual investment programmes that guarantee the funding and execution of large-scale IT projects?	N	N	N	N
AE4	Has the GT instigated a study that determines the university's IT assets?	N	N	N	N
Acquisitions policy					
AE5	Has the GT designed and published a policy that provides guidance on different types of acquisitions?	Y	Y	Y	Y
AE6	Has the GT promoted the design of an IT purchase procedure that includes the analysis of the different offers based on strategic objectives and not only on technical or economic criteria?	N	N	N	N
AE7	Has the GT promoted a study that evaluates the satisfaction of various stakeholders with the policies and procedures related to IT acquisitions?	N	Y	N	N
AE8	Has the GT designed and published a policy that provides guidance on different types of supplier relationships?	N	N	N	N
AE9	Does the university optimise its purchases using good practices (for example, purchasing consortia, discount negotiations, purchase of special offers, etc.)?	N	N	N	N
AE1(	Is cost accounting performed to establish the cost impact of each IT service in respect to all purchase costs, maintenance costs and other applicable costs?	Y	N	N	N
Suppliers					
AE1'	Has the GT designed and published a policy that provides guidance on different types of supplier relationships?	N	N	N	N
AE1:	Have service level agreements been set up with all IT suppliers?	Y	N	N	Y
AE1;	Are reports submitted to the GT that monitor the service levels agreed with suppliers?	Y	Y	Y	Y
AE1<	Has the GT designed and published a policy that reflects its stance in relation to the outsourcing of services?	N	N	N	N
AE1=	Has the GT promoted a study on the feasibility of externalising various services and does this study should encompass both the benefits and the risks for the university?	N	N	N	N

AC1	Every how many months does the GT review the performance of outsourced IT services and determine their continuity?	0	0		0
IT projects					
AE1(	Has the GT decided to establish a “portfolio of projects” as a methodology to carry out the planning of IT acquisitions aligned with the university’s strategic objectives?	N	N	N	N
AC2	Every how many months is a call launched to establish the “portfolio of projects”?	0	0	0	0
AE1'	Does the GT regularly publish the objectives of IT projects that are to be implemented?	N	N	N	N
AE1(	Has a template been created for IT projects which includes all important information (aims, benefits, steps to follow, performance criteria and associated risks) and that requires that the GT establish their order of completion?	N	N	N	N
AE1(	When calculating the costs of an IT project, are the IT investment and maintenance costs, human resource costs, training costs and the costs of organisational changes stemming from the project all taken into account?	Y	N	N	N
AE2(	Does the template for the creation of IT projects include the criteria necessary to regularly evaluate the continuity or termination of the service or the withdrawal of an IT system in order to make decisions thereon?	N	N	N	N
AE2'	When calculating the cost of an IT project, do these include the costs required to maintain the continuity of an IT-based service?	Y	N	N	Y
AE2(	When calculating the cost of an IT project, do these include the design of activities and the costs necessary to train all the people involved in that project so that maximum IT performance is obtained and the services offered are improved?	N	N	N	N
IT acquisitions and projects priority					
AE2'	Has the GT designed and published a set of criteria aligned with the strategic objectives which determines the priority of IT acquisitions and projects?	N	N	N	N
AE2(	When making an IT acquisition, does the evaluation criteria include the fact that the proposed equipment should be compatible with existing technologies, comply with standards and be flexible and adaptable for future changes that may occur within the university?	Y	N	Y	Y
AE2(	Has the GT designed and published an IT acquisition approval protocol that details all the people responsible for supplying information and making decisions?	Y	N	N	Y
AE2(	Does the GT have the ultimate responsibility for IT projects that are going to be implemented (both those that are centralised and delegated) and decide their priorities in such a way that a large portion of resources are channelled to the most important projects?	Y	N	N	Y

IT projects results					
AE2	Has a procedure been designed to continuously monitor IT projects and services in operation with a view to determining their performance, redesigning them, if necessary, and to continually seek cost savings?	N	N	N	N
AC3	Every how many months does the GT review the evolution of IT services and decide upon their continuity?	0	0	0	0
AE2	Does the GT know what percentage of IT projects are to be completed in time and with the planned resources?	N	N	N	N
AE2	Has the GT promoted the drafting of a procedure to measure whether the results of the projects, once completed, have met the planned objectives?	N	Y	N	N
AE3	When calculating the benefits of an IT project, are a wide range of aspects ranging from cost savings to user satisfaction measured?	N	N	Y	N
AE3	Does the GT regularly publish the benefits obtained in the university as a result of the IT projects completed?	Y	N	N	N
AC4	Every how many months does the GT publish a report that details the results of completed IT projects?	0	0	0	0
AE3	Has a procedure been designed to analyse the satisfaction of different user groups with the results of IT projects that have been completed and are now up and running?	N	N	N	N
Collaboration and comparison					
AE3	Has the GT designed a policy that determines whether it is a good idea to compare the results of IT projects with those of other universities and their subsequent communication to the university community and stakeholders?	N	N	N	N
AE3	Does the GT support initiatives aimed at exchanging experiences and collaborating with other universities?	Y	N	Y	Y
	NUMBER OF YES				9
	Total of Bpractices				34
	% Bpractices Satisfaced				26%

Performance Consensus

Answer Yes (Y) or No (N) or leave it blank if you don´t know		1	2	3	FINAL
Performance					
DE1	Has the GT designed and published a policy that reflects the expected performance of university processes that are IT-based?	N	N	N	N
DE2	Does the GT monitor whether the inefficient use of IT affects its performance and communicate the results to users so that they are aware of the need for correct usage?	N	N	N	N
DC1	Every how many months is a report sent to the GT that clearly states the performance level of IT services?				
DC2	Every how many months is an internal audit carried out to check the performance of IT services in operation?				
DC3	Every how many months is an external audit carried out to check the performance of IT services in operation?				
DE3	Has the GT devoted enough resources to maintain a high level of satisfaction in user groups related to the service with regard to performance of IT-based services?	Y	Y	Y	Y
DE4	Does the GT analyse to what extent IT helps to reach the strategic goals of each university service?	N	N	N	N
IT services continuity					
DE5	Is the GT informed on the risks and security problems that may affect the continuity of services so that they can decide on an acceptable level of risk for the university?	N	N	N	N
DE6	Has a plan been designed that ensures the continuity and availability of IT-based university services?	N	N	N	N
DE7	Has a contingency plan been designed that contemplates the recovery of a service in the shortest time possible after a serious incident takes place?	N	N	N	N
Information availability and quality					
DE8	Has the GT prepared a report to determine what information it must receive to help it take decisions?	N	N	N	N
DE9	Has a procedure been designed that ensures that the GT receives the information it needs to help it take decisions?	N	N	N	N
DE10	Are security measures in place to maintain the integrity and quality of institutional information?	N	N	N	N
DE11	Has the GT allocated a responsibility for establishing an information structure and the intelligent analysis thereof from a strategic standpoint?	N	N	N	N

Service level agreements					
DE12	Does the GT regularly analyse the requirements of users (for example, employees and students)?	N	N	N	N
DE13	Does the university actively manage user expectations (for example, through service descriptions, service level agreements, etc.)?	N	N	N	N
DE14	Have service level agreements been set up with all IT service users?	N	N	N	N
DC4	Every how few months are service levels reviewed and checks carried out to see whether these deviate from those agreed with users?	N	N	N	N
DE15	In the event that deviations in service level agreements are identified, are corrective measures adopted?	N	N	N	N
DC5	Every how few months are corrective measures applied to non-compliant service levels?	N	N	N	N
DE16	Has the GT promoted the design of a procedure to analyse the satisfaction of various stakeholders with relation to the university's IT-based services in operation?	N	N	N	N
	NUMBER OF YES				1
	Total of Bpractices				16
	% Bpractices Satisfaced				6%

Conformance Consensus

Answer Yes (Y) or No (N) or leave it blank if you don´t know		1	2	3	FINAL
Catalogues					
CE1	Has the GT officially assigned the responsibility of being aware of IT-related legislation to a person or a group of people?	Y	Y	Y	Y
CE2	Has a reference catalogue been compiled that contains the IT-related regulations and laws that affect the university and is this kept up to date?	N	Y	N	N
CE3	Has the GT defined and published a catalogue with all kinds of IT-related policies to guide the rest of the university community on how to implement IT on campus?	N	Y	N	N
CE4	Has the GT promoted the design and publication of a set of internal procedures and regulations that implement the previously defined IT policies?	N	Y	N	N
CE5	Has the GT promoted processes to communicate IT-related internal policies and regulations to facilitate their dissemination in all spheres of the university community?	N	N	N	N
CE6	Is there a measurement to determine the level of knowledge concerning IT policies and laws in the university community?	N		N	N
conformance					
CE7	Has the GT assigned a person or a group the responsibility of monitoring whether a person or group complies with the regulations?	Y	N	Y	Y
CC1	Every how many months does the GT review the skills of those in charge of ensuring the compliance of IT regulations in the university?	Y	N	Y	N
CE8	Are reports submitted to the GT that determine the level of compliance of internal procedures with external laws and policies?	Y	N	Y	N
CE9		N	N	N	N
CC2	Every how many months does the GT evaluate whether IT governance processes are properly carried out in the university?				
Audits					
CE10	Are those in charge of IT services and projects encouraged to take into account IT-related external regulations and laws and policies and internal procedures?	Y	N	Y	Y
CE11	Are internal audits carried out to check whether IT projects and services comply with IT-related external laws and regulations and internal policies and procedures?	Y	N	Y	Y
CC3	Every how many months is an internal audit carried out to check whether the regulations on IT projects and services are being observed?				

CE12	Are external audits carried out to check whether IT projects and services comply with IT-related external laws and regulations and internal policies and procedures?	Y	N	Y	N
CC4	Every how many months is an external audit carried out to check whether the regulations on IT projects and services are being fulfilled?				
CE13	Are reports submitted to the GT with the results of the internal and external audits, which clearly express the level of the university's level of compliance with regulations and the risks that these entail?	Y	N	Y	Y
CC5	Every how many months is a report submitted to the GT that clearly expresses the university's level of compliance with regulations and the risks that these entail?				
Standards					
CE14	Has the GT officially assigned to a person or group of people the responsibility of understanding the IT-related standards?	N	N	N	N
CE15	Has a reference catalogue been created that contains the IT-related standards applicable or already applied in the university and is this kept up to date?	N	N	N	N
CE16	Has the GT designed and disseminated a policy that promotes the general use of IT-related professional standards and best practices within the university?	N	N	N	N
CE17	Is IT management based on standard methodologies (for example ITIL or ISO 20000) carried out?	N	N	N	N
CE18	Is IT governance carried out on the basis of standards (ISO 38500, COBIT, etc)?	N	N	N	N
CE19	Are reports submitted to the GT that determine the level of uptake of IT standards in the university?	N	N	N	N
	NUMBER OF YES				5
	Total of Bpractices				19
	% Bpractices Satisfaced				26%

Human behaviour Consensus

Answer Yes (Y) or No (N) or leave it blank if you don´t know		1	2	3	4	FINAL
Stakeholders						
HE1	Are the various stakeholders identified and is there official documentation on how each one will participate in new IT initiatives? (possible stakeholders: heads of university user services, heads of daily operations of each service, heads of IT maintenance, participants in the design and planning of IT projects, second-level managers and executives (heads of service and deputy vice-chancellors), university service users, suppliers, competitors, partners, those in charge of drafting laws and regulations and observers of university processes).	N	N	Y	N	N
HE2	Are there different groupings of stakeholders so as to offer them different treatment when involving them in IT-supported change processes? (for example: grouping them based on their experience of IT use or forming groups according to age and level of responsibility, etc.)	Y	Y	Y	N	Y
HE3	Has the GT promoted the design of a procedure that serves to allow it to become aware of the IT-related needs and concerns of stakeholders affected by them?	N	N	N	N	N
Resistance to change						
HE4	Does the analysis identify risk factors arising from resistance to change in the people or groups affected and from a lack of commitment in those involved?	N	N	Y	N	N
HE5	Does IT project planning include activities aimed at mitigating the risk related to a lack of commitment in participants?	N	N	N	N	N
HE6	Has a process been set into motion to raise awareness that leads to reducing people's resistance to an IT-based change process (information, training, etc.)?	N	N	Y	N	Y
HE7	Does IT project planning include the responsibilities assigned to all participants and activities aimed at measuring the extent to which the involvement of these people contributes to the success of the project and therefore to the change process that it promotes?	Y	Y	Y	Y	Y
HE8	Have committees and work groups been created to facilitate the participation, and therefore the involvement, of stakeholders in the design, supervision and final evaluation of IT-based change processes?	N	N	N	N	N
HE9	Does IT project planning include a stage to train stakeholders on the change that is going to take place in the university service affected by the IT initiative?	Y	N	N	Y	N
HE10	Does IT project planning include a stage of cross training, training the heads of the university service in IT matters and technicians in the university process affected by the IT initiative?	Y	Y	Y	Y	Y
People in the process						

HE11	Has a professional career structure been designed that reflects promotions based on the acquisition of skills (also IT) and on successes obtained during change processes?	N	N	N	N	N
HE12	Is there a procedure established to measure the level of skills (especially those related to IT) of individuals in different interest groups?	N	N	N	N	N

Workload						
HE13	Does the GT know what human resources are available, what occupational roles there are at all times and what human potential is available to undertake new IT initiatives, avoiding overloads?	Y	Y	Y	Y	Y
HE14	Is there a procedure set up to measure the extent to which each IT project increases the workload of each individual or group participating and are there indicators that determine whether this is appropriate?	N	N	N	N	N

NUMBER OF YES	5
Total of Bpractices	14
% Bpractices Satisfaced	36%

Information Technology Governance for Tunisian Universities (ITG4TU)

561614-EPP-1-2015-1-ES-EPPKA2-CBHE-JP

Co-funded by the
Erasmus+ Programme
of the European Union

Meeting minutes

FSEGS, University of Sfax, Sfax, Tunisia
08 December 2016

ITG4TU CONSORTIUM

AMENDMENT HISTORY

Version	Revision	Date	Author	Modification
1	0	08Dec16	Slim Kallel	First version of the document
1	1	08Dec16	Ismail Bouassida	Minor changes
1	2	10Dec16	Slim Kallel	Minor changes

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1. Attendants

- Dr. Ismail Bouassida, member of the ITG4TU Team
- Dr. Slim Kallel, member of the ITG4TU Team
- Prof. Ahmed Hadj Kacem, member of the ITG4TU Team
- Ing. Ahmed Ben Arab, member of the ITG4TU Team

2. Agenda

2.1. Compilation the best practices situation

This meeting is planned after receiving the comments of the European ITG4TU team about the current situation of the best practices of the faculty.

This review contains:

- Some response on the questions sent with the best practices sheet.
- Some suggestions to modify this sheet and some comments to explain the need of such modifications to the success of the project.

Conclusion: A new version of the best practice sheet is sent to European ITG4TU team.

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07 March 2017

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Version	Revision	Date	Author	Modification
1	0	07Mar17	Slim Kallel	First version of the document
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1. Attendants

- Dr. Ismail Bouassida, member of the ITG4TU Team
- Dr. Slim Kallel, member of the ITG4TU Team
- Prof. Ahmed Hadj Kacem, Dean
- Dr. Chafik Aloulou, member of the ITG Committee
- Dr. Bilel Gargouri, member of the ITG Committee
- Dr. Hatem Hadj Kacem, member of the ITG Committee

2. Agenda

2.1. Presenting the maturity model Matrix

Dr. Ismail Bouassida, as coordinator of the project in the University of Sfax, presented the the maturity model Matrix. He introduced the different aspects of maturity model organized in different principles; Responsibility, Strategy, Acquisition, Performance, Conformance and Human behavior. After a discussion conducted by all the members, the dean has declared that the proposed maturity model is adequate for the faculty context. To support the choice of this model, the attendance requested the ITG4TU team to consult the partner Tuisian universities regarding the adoption of the maturity matrix.

Conclusion: The participants confirmed that this maturity model is adequate to the context of the faculty and consult the other Tunisian partners about their models.

3. Annex: Maturity model matrix

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Responsibility Consensus

	Evaluate	Direct	Monitor
Nonexistent 0	The directors have not allocated IT-related responsibilities.	The directors do not make IT-related decisions.	The directors do not carry out any type of monitoring of those in charge of IT.
Initial 1	The directors have allocated responsibilities related to IT management. The directors allocate responsibilities based on their own criteria since they are not aware of any existing models.	The directors monitor IT management but not in a planned Most decisions on IT are made by IT managers and these are confirmed by the directors.	The directors carry out an informal monitoring of responsibilities related to IT management.
Repetible / Intuitive 2	The directors allocate management responsibilities and some IT governance responsibilities. The directors allocate some IT governance responsibilities but they do not apply any type of IT governance model. The directors do not take into account if a person that is allocated a responsibility has the appropriate skills.	The directors take the responsibility of making decisions on IT. The directors endeavour to ensure that IT management is planned. The directors effectively communicate the main IT projects to the various stakeholders. The directors receive information that is scant and inadequate for	The directors check whether the responsibilities allocated are understood.
Defined 3	The directors are aware of all the options available to allocate all the responsibilities related to the current use of IT. The directors take into account the skills of those persons to which they allocates IT governance responsibilities. Those people are the top level managers in the university and are assisted by IT experts that The directors have allocated responsibilities to third parties. The directors review whether the responsibilities allocated have been carried	The directors are aware of the importance of their involvement in IT governance. The directors have designed an IT strategy aligned with the university's overall strategy. The directors have decided to apply an IT governance model. The directors communicate the importance of IT governance and the	The directors check whether the person who is allocated the responsibility understands it. The directors do not check whether all the responsibilities related to IT governance are allocated.
	The directors evaluate the options existing to allocate all the responsibilities related with the use of current and future IT.	The directors are fully involved in IT governance.	The directors check that suitable mechanisms have been put into place for good IT governance.

Measurable 4	The directors ensure that IT is used effectively, efficiently and in an acceptable manner in order to meet the university's The directors evaluate the competence of those who have been allocated the responsibility of making decisions on IT and supervise that these have been carried out	The directors ensure that the plans are carried out in accordance with the responsibilities allocated. The directors receive the information that they need to carry out their decision-making responsibilities and to be held The directors communicate the results of IT initiatives and the success of IT governance	The directors analyse whether those people who have been allocated responsibilities understand them, take them on and carry them out. The directors measure the performance of those in charge of IT governance, both of those who make decisions as well as those who supply them with information.
Optimized 5	The directors regularly review the models and options for allocating responsibilities. The directors regularly review the skills of those who have been allocated responsibilities and plan reallocations and	The directors have managed to involve all the university in IT The directors ensure that the plans designed are carried out. The directors receive the information they need to make decisions and proactively promote The directors communicate the results of IT governance processes in comparison with those of the other	The directors regularly measure the maturity of IT governance mechanisms. Regular checks are performed to see whether the responsibilities allocated or reallocated are understood and carried out. The directors measure the performance of those in charge of IT governance and communicate this to the various stakeholders.

Strategy Consensus

	Evaluate	Direct	Monitor
Nonexistent 0	The directors do not have sufficient IT developments to meet users' needs.	The directors perform IT management without any type of future planning.	The directors do not perform any type of monitoring of IT activity.
Initial 1	The directors believe the university has sufficient IT developments, although these are not integrated, to meet users' needs. The directors monitor IT activity but not in a way that is aligned with the university's strategic objectives. The directors analyse some of the risks albeit from an operational and legal compliance perspective but not taking into account business considerations.	The directors plan investments in IT for the coming year. The lack of involvement on the part of all the directors prevents any global policies relating to IT from being designed. There is very little innovation in IT as an attitude prevails that is acquiescent of technologies that can be applied to the business.	The directors monitor the projects at a superficial level for the purposes of justifying their expenditure.
Repetible / Intuitive 2	The directors believe sufficient integrated IT developments exist to meet users' needs. The directors monitor IT activity which begins to be aligned with the university's The directors analyse all the risks albeit from a technical and legal compliance perspective but not taking into account	The directors carry out medium-term IT planning but from a technological perspective, not with institutional University directors design some IT-related policies from a business point of There are innovations in IT but from a technical perspective, not from a business point of view.	The directors measure the results of IT projects from an operational perspective, but not from the university's business
Defined 3	The directors know that the university has sufficient IT developments to provide support for the current needs of the business. The directors monitor IT activity which is in line with the university's strategic objectives. The directors take IT-related risks into account when establishing the university's	The directors perform strategic IT planning aligned with the university's strategic objectives. University directors design global policies relating to IT from a business point of view. The directors begin to innovate in IT based on strategic objectives?	The directors measure to see whether projects are completed on time and with the resources planned but do not measure to see whether the benefits The directors check to see whether policies concerning IT are being applied throughout the university.
	The directors evaluate IT assets and ensure they will provide support for the university's future needs.	The directors design policies and plans that aim to help the university benefit from the full potential of IT assets.	The directors monitor the progress of IT initiatives to ensure that the desired objectives are achieved on time and with

Measurable 4	The directors analyse their plans and policies to ensure that IT activities are aligned with the institutional objectives, even if circumstances change, and that best practices are included and all The directors should make sure IT performance is submitted to an evaluation to assess the risks for the organisation.	The directors should encourage proposals for the innovative use of IT, which will enable the university to respond to new challenges, exploit new business opportunities or improve operational	The directors measure the results of IT initiatives to see whether the desired benefits have been obtained. The directors check to see whether IT-related policies are being implemented throughout the organisation and the
Optimized 5	The directors foresee the evolution of IT development to provide future support for the business and regularly review such The directors design IT activities to ensure they are currently aligned with the business objectives and regularly review them to make sure they remain so in the The directors manage current risks and make a proactive forecast of future risks linked to the evolution of the business and	The directors regularly review plans and policies so that they can always obtain the maximum value from IT assets. The culture of IT innovation is typically continuous, proactive and tends to anticipate the needs of the university. The culture of IT planning and innovation pervades the entire organisation.	The directors regularly review the results of multi-annual programmes to see whether objectives are met on time The directors regularly propose new policies based on the results and satisfaction generated by current policies.

Acquisition Consensus

	Evaluate	Direct	Monitor
Nonexistent 0	The university directors do not determine major IT acquisitions.	The directors have not established any procedures on how to make IT acquisitions.	The directors do not check whether the IT assets meet the objectives for which
Initial 1	The directors determine acquisition mainly on the basis of criteria aimed at reducing costs. Each director determines acquisitions for their own sphere of influence, there being no single decision at institution level.	The reports drawn up to support an acquisition purchase usually include more technical and economic data than other criteria used by directors in the decision-making process. The budget for IT acquisition is distributed over various cost and decision-making centres.	When calculating the cost of a project, particular consideration is taken of the investment and maintenance costs while other costs (human resources and training initiatives) deriving from the organisational change caused by the IT project are
Repetible / Intuitive 2	The directors draw up a diverse set of general criteria (in addition to the cost savings) to be taken into account when making an acquisition. The directors decide on a joint, consensual basis what IT investments should be made at the level of the institution. The directors draw up the criteria and policies for conducting relations with	The directors have designed policies and internal procedures that include general criteria to be taken into consideration with regard to IT acquisition. The budget for IT acquisition is centralised and completely separate from other items. The directors have drawn up criteria and simple procedures for conducting relations	When calculating the cost of a project, not only the investment and maintenance costs, but also the costs for human resources, training and the generally the costs of organisational changes stemming from the IT project are all taken into The directors know what IT assets the university currently has available.
Defined 3	The directors design the strategies and stipulate priorities for acquisition purposes. The directors evaluate the results of the services in operation to determine whether they should continue. The directors evaluate new purchases by subjecting them to a thorough analysis, which includes: aims, benefits, steps to follow, performance criteria and associated risks.	The directors plan acquisition in such a way that it can form the basis for future budgeting. There is an IT acquisition approval protocol that details all those responsible for providing information and taking decisions. When drawing up a project, its aims, benefits, steps to follow, performance criteria and associated risks are all included.	The directors measure the results of the projects to establish whether the desired results have been obtained. The directors receive reports that enable them to monitor the services in operation with a view to redefining them to save The directors monitor compliance with the levels of service agreed upon with the suppliers.

	The directors consider the possibility of outs	The directors have set up short-term service	The directors measure the satisfaction of all stakeholders with respect to IT policies and acquisition procedures.
Measurable 4	The directors jointly prioritise purchases on the basis of clear, transparent criteria that have been determined from the strategic objectives set by the university. The university directors carry out a thorough analysis of the costs, benefits and risks of the various alternatives and decide on the one that offers a balance of risks and The directors analyse the feasibility of outsourcing each IT service based on various criteria and then decide which ones should	The directors have determined a procedure establishing the best way to purchase IT, which includes preparing the appropriate documents to help achieve the The documentation for IT projects includes the criteria necessary to regularly evaluate the continuity or termination of the service or the withdrawal of an IT system. The directors plan supply agreements that can satisfy the needs of the university in the medium or long term. The directors have designed a policy establishing the criteria to implement the outsourcing of an IT service.	The directors monitor the projects being implemented and the services in operation to ensure that the objectives set have been achieved. When calculating the costs and benefits of a particular acquisition, a wide range of aspects, from the cost of the investment to user satisfaction, are measured. Outsourced services are measured for performance and the directors are informed.
Optimized 5	The directors regularly assess the results of the IT projects and services in operation, determine their feasibility and decide on whether they should continue. The directors regularly review the feasibility of outsourced services and decide on whether they should be continued in the short and long term on the basis of flexible service agreements that can be adapted aligned with any changes arising at the university. The directors understand and apply the best practices known with respect to managing acquisition (outsourcing, consortium-based purchasing, renting, etc.). The directors instigate working in conjunction with other universities on the development of joint projects, consortium-	The directors plan and establish the priority for IT projects or acquisitions by means of a procedure including multi-annual programmes that are reviewed on a regular The directors have established a well-known, clear, transparent acquisition procedure that has the backing of the suppliers and is reviewed on a regular basis. The directors have developed a procedure to establish if, once implemented, the resource acquired meets the needs of the university.	The directors check the extent to which acquisition objectives are shared by the supplier. The directors know the cost impact of each service as a result of all the acquisition costs, maintenance costs and other applicable costs (cost accounting).

Performance Consensus

	Evaluate	Direct	Monitor
Nonexistent 0	The university directors do not evaluate IT activity since this is left entirely in the hands of the IT managers.	Planning is very difficult because IT assets are clearly insufficient.	No measure is taken of IT performance.
Initial 1	The directors evaluate the operational proposals put forward by the IT managers, albeit only from a technical and/or economic Key decisions concerning the performance level of the services will be taken by IT	IT assets cover the major operations of current university services (though not all those deemed desirable). IT managers normally have an excessive workload.	Only the cost of the services is measured as an index for prioritising the allocation of IT
Repetible / Intuitive 2	The directors evaluate the operational proposals put forward by IT managers with regard to the institution's own objectives. The directors understand the university's reliance on IT and they are beginning to engage in taking decisions relating to IT performance. The directors analyse and find out about the needs of IT service users.	The directors plan IT assets so as to cover all the operations carried out by today's university services but without giving IT managers an excessive workload. The directors design policies and standards to reflect the most important aspects regarding the performance of IT-based university processes.	The directors measure to see whether the IT assets provide support for the university's main services and whether their users The directors check whether any internal standards and policies have been drawn up for key aspects concerning the
Defined 3	The directors check that the operational solutions keep the university processes based on IT working properly (with the appropriate The directors manage the IT risk and guarantee the availability of university services based on IT assets. The directors also analyse the risk for the integrity and quality of the information.	The directors plan adequate IT assets so as to be able to offer services based on IT and guarantee their availability. The directors prioritise IT investments based on the institution's objectives. The directors are beginning to receive adequate information to take decisions but it is still somewhat scant.	The directors evaluate to what extent the IT assets provide support for the university The directors check compliance with the internal standards and policies The directors check to see whether the allocation of resources has been prioritised in
	The directors check whether the operational solutions keep the university processes working properly and whether they satisfy their users.	The directors ensure that there are sufficient resources for IT to meet the needs of today's university services, in accordance with the priorities established, and maintain them, and also to be in a position to invest in IT innovations.	The directors check the extent of compliance with respect to the policies concerning adequate IT performance and quality of information.

Measurable 4	The directors understand and manage the risk of IT activity to ensure the continuity of the university services. The directors understand and manage the risk to the integrity and quality of the information. The directors should evaluate various solutions to ensure that decisions taken concerning IT are the most efficient with The directors should evaluate the IT governance system for efficiency and	The directors should make sure procedures are in place to provide information that is correct, up to date and protected against loss or inadequate use, to help them take decisions. The directors have defined a procedure that determines how to allocate resources and prioritise IT investment in accordance with the aims of the institution.	The directors measure IT performance to check to what extent it provides support for the institution's current aims and The directors monitor the degree to which the allocated resources and investment are prioritised in accordance with
Optimized 5	The directors check whether the operational solutions keep current and future university processes working properly. The directors manage the IT risk in accordance with today's IT-based university services and analyse those that will be available for future services. The directors guarantee the integrity and quality of both current and future information by performing periodic reviews. The directors should evaluate the IT governance system for efficiency and adequate performance on a regular basis.	The directors make sure that sufficient IT assets are available to maintain current business and invest in IT innovation, in order to guarantee the future development of the business. The directors receive the information that they need to make decisions and proactively promote the search for further useful information.	The directors are capable of predicting to what extent IT assets can provide support for future university services. The directors are capable of predicting a prioritised allocation of resources with respect to the institution's future objectives. The directors regularly check to see to what extent the policies and standards comply with the adequate performance of IT

Conformance Consensus

	Evaluate	Direct	Monitor
Nonexistent 0	The university directors do not know what legislation exists in relation to IT assets.	There are no mechanisms for encouraging compliance with laws, regulations and standards governing IT assets.	The directors do not check to see whether the university complies with IT-related regulations and
Initial 1	The directors have assigned the responsibility of finding about the legislation concerning IT and ascertaining how it affects the university. The directors are familiar with key IT-related standards, although they are not widely implemented.	Those in charge of IT exhibit the proper professional behaviour with respect to the regulations, even though there are no formal mechanisms for achieving such compliance.	Only with respect to certain individuals or on specific projects is a check made to ensure compliance with regulations (in
Repetible / Intuitive 2	The directors have designed all types of policies (strategic, operational and user-related) to guide the rest of the university community about how to implement IT assets on campus. The directors have designed a policy to encourage widespread use of IT-related standards and best practices.	The directors have set up procedures for providing information on policies that facilitate their acquaintance at all levels of the university community. The directors have established internal rules and procedures concerning IT management, based on university policies.	The directors check that acquaintance with the IT-related laws and regulations is widespread. The directors check that at least all IT-related external laws are respected.
Defined 3	The directors know the degree of compliance with IT-related external laws and regulations and internal policies. The directors understand the importance of good IT governance and have taken on the responsibility of monitoring such compliance.	The directors have encouraged mechanisms to be implemented to achieve compliance with the laws, regulations and standards in force. The directors have made plans to adopt an IT governance system.	The directors have implemented internal audits to check that IT-related external laws and internal The directors receive reports on compliance with the regulations and the implementation of
Measurable 4	The directors evaluate the extent to which the laws, internal policies and standards are met and are satisfied with the level of compliance. The directors have managed to ensure that internal policies encourage the proper use and integration of IT assets. The directors support the adoption of an IT goverr	The directors have planned the widespread adoption of all possible standards, best practices and professional guides. The directors have approved procedures to implement the policies and processes relating to IT governance. The directors have set up mechanisms to check whether their policies are being respected and others to ensure compliance with internal IT-related regulations.	The directors compare their internal audits with other external audits to verify full compliance with The directors check that their IT assets preserve the university's privacy and strategic knowledge.

Optimized 5	The directors regularly update internal IT policies and compare them with the best practices of other universities. The directors regularly review the skills of those responsible for ensuring compliance with regulations. The directors regularly evaluate whether all the processes stipulated are performed in their IT governance system.	The directors design procedures enabling the university community to acquire the utmost professionalism, taking best practices and professional guides as their reference. The directors regularly update the mechanisms to check whether laws, regulations, policies and standards are being The directors plan the updating of the procedures relating to IT governance established in the organisation. The directors make sure all IT-related actions are ethical.	The directors regularly perform internal and external audits to verify compliance with the laws and internal procedures characteristic of The directors regularly receive reports that are very clear and proper for evaluating the extent of

Human behaviour Consensus

	Evaluate	Direct	Monitor
Nonexistent 0	The university directors are not aware of how importan	The university directors do not consider h	The influence of a person's behaviour on the success of IT-supported processes is not
Initial 1	The directors are concerned that everyone needed to complete the IT activity should take part.	Some IT projects fall behind or fail due to lack of implication on the part of the The directors are concerned to offer technical training and teach the people participating in IT projects how the	The directors monitor the projects, basing their analysis
Repetible / Intuitive 2	The directors are concerned to determine which people should be involved and those who are affected by IT activities.	Risk analysis of the IT projects includes elements relating to the lack of commitment on the part of the participants. The university community is informed of the IT projects that are to be conducted.	IT projects are submitted for a final evaluation but solely on the basis of technical
Defined 3	The directors are concerned to define groups of people or communities whose behaviour may vary with respect to the IT activities. The directors take into account how these communities are affected by the change processes facilitated by IT assets. The directors endeavour to make each person or group's workload appropriate.	All stakeholders participate in the design, supervision and final evaluation of IT projects. The directors plan the whole training package for those in charge of university services to involve them in the change The directors have established procedures for informing the university community about the progress and	The directors monitor and conduct a final evaluation of the projects, with their success being measured on The directors evaluate the extent to which the individuals' commitment The directors are aware of and evaluate whether each person or group's workload is
Measurable 4	The directors are aware of the importance of the change processes and how these will affect the behaviour of the people involved. The directors are concerned to define communities and encourage maximum involvement in the new process of change facilitated by the IT assets.	The directors have planned comprehensive cross training, providing training for those in charge of services in IT matters and technicians in university The directors have instigated the setting up of committees and work groups to facilitate the participation and subsequent implication of stakeholders in the change	The directors understand the influence people have, either as individuals or as a group, on the success of the The directors know what the level of satisfaction is of the various stakeholders involved with respect to the results of

	The directors endeavour to tackle any potential resistance to change in a positive and proactive manner.	The directors support a professional career structure that bases promotion based on skill acquisition.	
Optimized 5	The university directors guarantee that IT activities are successful by identifying the potential behaviour of the people involved or affected by such activities. The people that need to become involved in the change processes are identified on a regular basis. These are extended to the whole university community and generate new skills for the institution. The directors analyse the workload assigned to each individual or group in a proactive and flexible manner and predict future responsibilities.	The directors plan to train people to overcome opposition to change and promote attitudes and skills to support it. The directors expect that any person affected by or involved in IT activity can report on their needs and concerns and identify the opportunities and risks inherent in such activity. These risks are managed in accordance with established policies and procedures and are submitted to the university's Steering Committee so that they might The directors regularly review the professional career structure so that it always reflects promotion based on successes achieved during the change	The directors constantly monitor all IT activities to make sure that everyone is taken into account and due The directors monitor the work processes to check that IT is used properly and is based on the appropriate workload of the people The directors always measure the success of IT projects and compare their results with that of other

Information Technology Governance for Tunisian Universities (ITG4TU)

561614-EPP-1-2015-1-ES-EPPKA2-CBHE-JP

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Meeting minutes

FSEGS, University of Sfax, Sfax, Tunisia
04 April 2017

ITG4TU CONSORTIUM

AMENDMENT HISTORY

Version	Revision	Date	Author	Modification
1	0	04Apr17	Slim Kallel	First version of the document
1	1	06Apr17	Ismail Bouassida	Minor changes

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1. Attendants

- Dr. Ismail Bouassida, member of the ITG4TU Team
- Dr. Slim Kallel, member of the ITG4TU Team
- Prof. Ahmed Hadj Kacem, member of the ITG4TU Team
- Ing. Ahmed Ben Arab, member of the ITG4TU Team

2. Agenda

2.1.Compilation the maturity model matrix

The ITG4TU project committee met to discuss the decision taken in our last meeting about the maturity model. Dr. Ismail Bouassida, as coordinator of the project in the University of Sfax, proposes to contact the project coordinators of other involved Tunisian universities to share with them our decision and discuss their point of viewss on the adequacy of the maturity model with the Tunisian context. The ITG4TU Team examined the current level of maturity.

Conclusion: The project coordinator will meet the coordinators of the universities of Gabes, Tunis Elmanar, and Manouba.

3. Annex: Current situation of the Maturity model matrix

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	Responsibility	
Evaluate	1	The directors allocate management responsibilities and some IT governance responsibilities.
Direct	1	The directors monitor IT management but not in a planned way.
Monitor	2	The directors check whether the responsibilities allocated are understood.
	Strategy	
Evaluate	2	The directors believe sufficient integrated IT developments exist to meet users' needs.
Direct	0	
Monitor	1	The directors monitor the projects at a superficial level for the purposes of justifying their expenditure.
	Acquisition	
Evaluate	0	The university directors do not determine major IT acquisitions.
Direct	1	The reports drawn up to support an acquisition purchase usually include more technical and economic data than other criteria used by directors in the decision-
Monitor	1	When calculating the cost of a project, particular consideration is taken of the investment and maintenance costs while other costs (human resources and training initiatives) deriving from the organisational change caused by the IT project are normally excluded.
	Performance	
Evaluate	1	The directors evaluate the operational proposals put forward by the IT managers, albeit only from a technical and/or economic perspective.
Direct	1	IT assets cover the major operations of current university services (though not all those deemed desirable).
Monitor	1	Only the cost of the services is measured as an index for prioritising the allocation of IT assets.
	Conformance	
Evaluate	0	The university directors do not know what legislation exists in relation to IT
Direct	1	Those in charge of IT exhibit the proper professional behaviour with respect to the regulations, even though there are no formal mechanisms for achieving such compliance.
Monitor	2	The directors check that acquaintance with the IT-related laws and regulations is widespread.
	Human Behaviour	
Evaluate	4	The directors are concerned to define communities and encourage maximum involvement in the new process of change facilitated by the IT assets.
Direct	1	Some IT projects fall behind or fail due to lack of implication on the part of the people involved.
Monitor	1	The directors monitor the projects, basing their analysis solely on technical indicators.

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1. Attendances

The ITG4TU Tunisian coordinators:

- Dr. Mehdi Khouja as coordinator form UGB
- Dr. Youssef Ben Halima as coordinator from UMA
- Dr. Samir Moalla as coordinator from UTM
- Dr. Ismael Bouassida as coordinator form US

2. Agenda

A meeting was held via skype on April 19th, 2019. In this meeting, the Tunisian coordinator discussed the adaptation of the maturity model matrix.

Adaptations on IT Governance maturity model:

Each coordinator gave a feedback about the adequacy of the maturity model matrix for his university. The discussion was focused on the aspects of the maturity model to include or exclude from the Tunisian ITG maturity model. The attendances agreed to adopt the same maturity model for the four Tunisian universities. The model will consist on various aspects (Evaluate, Direct and Monitor) organised into six ITG principles.

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1. Attendants

- Dr. Ismail Bouassida, member of the ITG4TU Team
- Dr. Slim Kallel, member of the ITG4TU Team
- Prof. Ahmed Hadj Kacem, member of the ITG4TU Team
- Ing. Ahmed Ben Arab, member of the ITG4TU Team

2. Agenda

2.1. Selection of the maturity goals

The ITG4TU project committee met to discuss the decision taken in our last meeting about the maturity model. Dr. Ismail Bouassida, as coordinator of the project in the University of Sfax, proposes to select the maturity goals and the associated actions.

1. For the principle Responsibility:

The faculty can reach the level 2 of maturity so the following list of action was identified by the ITG4TN Team to do so.

a. It should be understood that IT governance is the responsibility of the GT
b. An IT Strategy Committee should be set up.
c. ·An IT Steering Committee should be set up.
d. The GT should ensure that representatives of all IT users and managers participate in the IT Steering Committee.
e. Create the CIO role and include it in GT
f. The CIO should take part in preparing strategic plans.

2. For the principle Strategy:

The faculty can reach the level 2 of maturity so the following list ofaction was identified by the ITG4TN Team to do so.

a. The Governance Team should design a general strategic plan and include in it the strategic planning of IT.
b. The GT should design a set of IT policies, aligned with the university's strategy, that are a reference to guide those who have to make IT-related decisions in the university.

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c. The GT should design medium-term IT infrastructure renewal plans to prevent this from becoming obsolete while at the same time incorporating emerging technologies.
d. Design a catologue of IT policies

3. For the principle Performance:

The faculty can reach the level 2 of maturity so the following list of action was identified by the ITG4TN Team to do so.

a. The GT should devote enough resources to maintain a high level of satisfaction in user groups related to the service with regard to performance of IT-based services.
b. The GT should design a policy that reflects the expected performance of university processes that are IT-based
c. Create a mesure of value of catalogue indicator of IT management

4. For the principle Conformance:

The faculty can reach the level 1 and after that 2 of maturity so the following list of action was identified by the ITG4TN Team to do so.

a. The GT should officially assign the responsibility of being aware of IT-related legislation to a person or a group of people.
b. A reference catalogue should be compiled that contains the IT-related regulations and laws that affect the university and this should be kept up to date.
c. The GT should officially assign to a person or group of people the responsibility of understanding IT-related standards.
d. A reference catalogue should be created that contains the IT-related standards applicable or already applied in the university and this should be kept up to date.
e. The GT should promote the design and publication of a set of internal procedures and regulations that implement the previously defined IT policies.

Conclusion: The project coordinator proposed to contact the dean to discuss with him the possibility to implement these actions.

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IT Governance in higher education institutions: A systematic literature review

Mehdi Khouja[1], Ismael Bouassida Rodriguez[2], Youssef Ben Halima[3], and Samir Moalla[4]

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[2]ReDCAD, University of Sfax, Tunisia
[3]University of La Manouba, Tunisia
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Abstract

Information Technology (IT) is a very important aspect for higher education institutions (HEI) in both teaching, research and administration. The managers of those intuitions are more and more aware that IT is a strategic tool for their institutions. On the other hand, IT Governance (ITG) is getting attention from the practitioner and research side, given the need to govern IT extending the organisation's strategy and objectives into IT. ITG helps to set clear expectations, to gain participation, open communications, establish accountability and provide executive management oversight. Thus, it is important to consider ITG and the alignment with business strategy for HEI. In this article, authors present a Systematic Literature Review (SLR) on ITG in HEIs using a collection of scientific and non-conventional data (grey literature). The motivation that drives this literature review is the further development of an ITG framework for Tunisian universities. This work aims to define the situation of the ITG in other countries. This work aims to provide a map of the state of the art of IT governance in HEI in various countries. Results show a mixed situation of ITG in HEIs. Some countries have the support of top level management to introduce ITG in HEIs by adopting regulatory frameworks and common laws. But other countries relay in their strong culture of ITG. The different case studies presented in this review show that there is no consensus on the ITG framework or standard to use in HEI. An important number of institutions are implementing COBIT or ISO best practices. In the other hand, some counties have developed their own frameworks. Results show there is no a single way to implement an ITG framework designed for HEI. However, it is also true that there are two mandatory aspects that are necessary to implement in ITG deployments: firstly, establishing a committee structure for IT assets and secondly, enable effective communication between the IT, the business and the stakeholders.

1 Introduction

Information Technology (IT) has become a very important for higher education institutions (HEI) in teaching, in research and in administration. IT is necessary in the way that provides support to university services. We can consider that IT is a strategic tool for universities. From this remark we can say that IT governance (ITG) in HEI is critical due to the strategic aspect of IT. The main objective of IT Governance is to align business strategy with IT strategy. To do so it is important that IT Governance includes strategies, policies, responsibilities, structures and processes for using IT within an HEI. The implementation of an IT Governance system in a HEI can determine who is responsible for IT strategic planning, decision making and the exploitation of IT. This way the cost in IT investment will be mastered by the introduction of project management and prioritization of investments. It is important to look in the literature to identify best practices in this domain to implement a more efficient IT Governance framework for a HEI. The motivation that drives this literature review is the development of an ITG framework for Tunisian universities within the context of a capacity building project entitled" Information Technology governance for Tunisian Universities (ITG4TU)". This work aims to define the situation outside the consortium of the project. Hence, studies describing ITG in Spain, Germany and Norway will not be included in this review. This work aims to provide a map of the state of the art of IT governance in HEI in various countries.

After reviewing the research studies on ITG, a unique review study on ITG in higher education institution was found (Valverde-Alulema, Meza-Bolaños, & Mejia-Madrid, 2017). This work, published in Spanish, shows the interest in this subject in the scientific community. It focuses on analysing the practice of IT portfolio. Nevertheless, it does not answer to specific research questions. It does not illustrate the current state of maturity and best practices in different HEI. The study conducted in our work will give a map of ITG in higher education institution in different countries.

The remainder of this paper is organized as follows: Section 2 describes the method used to perform the systematic literature review. The search results are presented in section 3. Finally, the findings about IT Governance in Higher Education Institutions in several countries are discussed.

2 Method

The state of the art on IT Governance in HEI is realized as a systematic literature review (SLR) based on the guidelines as proposed by Kitchenham (Kitchenham, 2007). An SLR is a means of synthesis of best quality scientific works on a specific topic or research question. The steps in the systematic literature review method are detailed below.

2.1 Research questions

The review focuses on five research questions:

- What is the state of the university before implementing ITG?
- How much advanced is the implementation of ITG in the HEI?
- What framework/standards of ITG are implemented in the HEI? How the implementation process was executed?
- How IT is aligned to the university strategy?
- What best practices can be learnt from the ITG implementation? What tools are used for IT alignment, IT portfolio…?

2.2 Search process

The search process was a manual search on specific online databases. The selected sources are shown in table 1.

Table 1: Literature sources

Source	Type of source	Search URL
IEEE Xplore Digital Library	peer-reviewed paper	ieeexplore.ieee.org
ACM Digital library	peer-reviewed paper	dl.acm.org
Hyper Articles en Ligne (HAL)	Open archive	hal.archives-ouvertes.fr
Springer	peer-reviewed paper	www.springer.com
Science direct	peer-reviewed paper	www.sciencedirect.com
Web of Science (WoS)	peer-reviewed paper	webofknowledge.com
Google Scholar	Meta search engine includes peer reviewed paper and grey literature	scholar.google.com

The same request was used in the search engines of the different literature sources. The search query was (" Information technology governance" OR" IT governance" OR" ICT governance") AND (" higher education"). The term university was discarded from the search query since it usually appears in the affiliation section of the paper.

2.3 Inclusion and exclusion criteria

After obtaining the search results from the different sources, a set of exclusion/inclusion criteria was applied:

Inclusion Criteria:

- Publications that match one of the search items,
- Publications that have best practices examples
- Publications, that are related to higher education institutions/universities
- Publications that are related to universities outside the consortium ITG4TU
- Publications that relate to the research questions.

Exclusion criteria:

- Publications that not match one of the search items
- Publications that do not have best practices examples
- Publications that are published before or on the 2016
- Publications that are related to universities inside the ITG4TU consortium

2.4 Data Collection

The different studies retrieved from the search process were stored in a reference manager (Mendeley). The data extracted from each study were:

- The publication year.
- The country of the discussed case study. Generic category was given to papers which discuss ITG in HEI in general terms without specifying the country.
- The university/HEI subject of the study.
- Information about the research questions if exists.

3 Search Results

The number of papers resulting in the search is summarized in table 2.

Table 2: Search results

Resource	Number of papers
ACM	3
IEEE	49
HAL	7
Google Scholar	63
Springer	67
Science Direct	38
WoS	33
Total	260

After filtering irrelevant, duplicate and incomplete papers, a total of 46 papers were selected for the reviewing process. Four papers could not be reviewed. because the paper complete version could not be acquired. Table 3 presents the filtering process.

Table 3: Filtered search results

Irrelevant and duplicates	19
Incomplete and not related to RQ, excluded by reading title and abstract	187
Exclusion criteria	4
File not found	4
Total for full-text reading	46

The state of the art is presented as follows according to the different cases of ITG grouped by country. The selected papers are distributed as shown in table 4.

Table 4: Selected research papers per country

Country of study	Number of reviewed papers	References
Australia	6	(Bhattacharjya & Chang, 2006a, 2006b, 2007a; Hicks, Pervan, & Perrin, 2010; Khther & Othman, 2013)
Bangladesh	1	(Dey & Sobhan, 2007)
Brazil and Portugal	4	(Bianchi & De Sousa, 2015; Bianchi & Sousa, 2016; de Souza Bermejo & Tonelli, 2011; Martins, Cunha, Figueiredo, & Dias, 2009)
Brunei	1	(Seyal, Poon, & Tajuddin, 2017)
Ecuador	2	(Montenegro & Flores, 2016; Valverde-Alulema & Llorens-Largo, 2016)
Egypt	1	(El-Morshedy, Mazen, Hassanein, Fahmy, & Hassanein, 2014)
Gulf	1	(Sahraoui, 2009)

Indonesia	5	(Afriliana & Gaol, 2014; Maria, Fibriani, & Sinatra, 2012; Nugroho, 2014; Sadikin, Hardi, & Haji, 2014; Suwito, Matsumoto, Kawamoto, Gollmann, & Sakurai, 2016)
Malaysia	5	(Ahlan, Arshad, & Ajayi, 2014; Ajayi & Hussin, 2014; Azizi Ismail, 2010; Ghavifekr & Hussin, 2011; Ismail, 2008)
Poland	1	(Pankowska, 2007)
South Africa	2	(Johl, Flowerday, & Von Solms, 2014; Ngqondi & Herselman, 2014)
Taiwan	1	(Hung, Hwang, & Liu, 2013b)
Thailand	3	(Jairak & Praneetpolgrang, 2011; Jairak, Praneetpolgrang, & Subsermsri, 2015; Praneetpolgrang, Poprom, & Kitratporn, 2006)
UK	2	(Barn, Clark, & Hearne, 2013; Coen & Kelly, 2007)
United States and Canada	7	(Bichsel & Feehan, 2014; Council III, 2006; Dlamini, 2013; Krueger, 2009; Liu, Huang, & Lucas, 2016; Winston, 2010; Yanosky & Caruso, 2008)
Generic	4	(Kilic & Metin, 2012; Knahl, 2013; Kwon, 2008; Mirski & Kilian, 2012)
Total	47	

4 Findings

The review process of the different selected papers was done by grouping the studies per country. For each country, the process consisted in answering the five research questions defined previously.

4.1 Australia

Many papers cover the IT governance in Australia and especially in the Higher Education Institutions. In (Bhattacharjya & Chang, 2006a, 2006b, 2007a, 2007b) ,the authors explain how ITG was established in four institutions. As HEIs are crucial for the Australian economy, it plays a double role in consuming and providing IT services at the same time. This is different from Tunisian Institutions who are considered as IT consumers in most cases.

To do so, the Australian Institutions use many standards. For example, the First institution has an overall strategic plan and follows a balanced scorecard. They have an ICT enabling plan, which is regularly updated. An important issue in this regard is that this ICT enabling plan is not directly associated with a budget for strategic expenditures. For standards, it uses COBIT, P-CMM, ITIL and ISO17799. The second institution uses COBIT, ISO 17779 and ITIL. The third one implements DRP, BCP, ITIL and APT methodology while the Fourth institution did not present any standard.

The strategic objective of the universities is to achieve excellence in teaching, learning, research and development. Some priorities fixed like providing flexible learning opportunities, developing facilities and technological infrastructure to support research priorities, forming partnerships with industry and government and improving its revenue generation. An ICT plan was also enabled, and it was regularly updated to align with the university strategy.

What we can learn from this experience is that the formation of the IT strategy committee, which reports to the institution planning and management committee and advises it, is the best solution for IT governance implementation. It must include the Director of central IT services, representatives of all divisional IT groups, the Director of Finance, representatives from R&D, the Deans and the rectors and key stakeholders. The committee needs to advise using recommendations regarding the alignment of ICT with the goals of the institution fixed by the rector, monitors the activities of the central and divisional IT service providers and fosters effective communication amongst them. In all four institutions the communication was improved between central IT and divisional IT groups and other key stakeholders.

In addition, the experience shows that the consolidation of systems is based on the consolidation of services. For example, in some institutions, consolidation of the helpdesk applications and tools has led to increased satisfaction amongst users. Authors in paper (Hicks et al., 2010) present the result of a survey among 58 decision makers. The university made an initial attempt to move to a centralized IT structure because of a recommendation from an external consultant commissioned to review the universities IT governance structure. A peak governing body, the Information Plan and Advisory Committee (IPAC), were created to oversee the IT function. However, a second review by an internal audit

into ICT governance in the university in early 2005 made and concludes that the IPAC was not providing sufficient leadership in ICT. Also, accountability and role responsibilities were not clearly defined or designated in ICT related areas. There was a lack of coordination and communication for ICT between faculties and the risk assessment was incomplete and major ICT related risks had not been addressed. We noticed that COBIT was used as a governance framework for this university.

This results in several mechanisms that have been developed to assist in the alignment of IT and business goals. These have occurred at the strategic level to ensure university-wide alignment, and at the faculty level to ensure that faculties retain a voice in the IT planning process, as well as to assist in the alignment of IT with the goals and strategies of the individual faculties.

The study cases of the Curtin University of Technology, and Viana do Castelo Polytechnic Institute are discussed (Khther & Othman, 2013). The universities must focus on encapsulating IT as part of their strategy. Furthermore, for achieving the objectives of the universities, to improve their competitiveness and effectiveness, the decision makers decide to establish strategic objectives and to make the appropriate decisions in terms of investing on IT. So COBIT 3.0, 4.0 and 4.1 are used as standards and the managers finally reduce the time required for the implementation of its IT governance program, success in achieving its fundamental goals of IT.

We can learn from this experience that the communication enhancement between IT and business has resulted in the increasing acceptance of IT.

4.2 Bangladesh

In (Dey & Sobhan, 2007), the authors choose one university and make a survey among the university to collect data satisfaction. In the paper, they did not explain how the university was before IT governance implementation. COBIT was designed as a high-level framework for e-Governance by the e-Governance Institute and it works well with frameworks like ITIL which focuses on specific aspects of e-Management. In the studied university, an IT Governance Structure was established, and his main role was to identify external and internal services, then identify the Human Resources and their Roles and finally form the necessary ICT committees. For the IT Governance Processes, the committee starts with identifying challenges for e-Governance implementation and mitigate them; next, they plan the necessary information systems and finally identify suitable tools and project management framework.

4.3 Brazil and Portugal

An IT governance model for Brazilian and Portuguese universities is proposed in (Bianchi & De Sousa, 2015). The model intends to incorporate structures, processes and relational mechanisms suitable for public universities. This study aims to contribute regarding the adoption of framework such as COBIT and ITIL in the context of public university. In (de Souza Bermejo & Tonelli, 2011) IT governance is discussed in public organization and not especially in universities (with a public university as an example). A seven-phase method was designed to

implement IT Governance. It starts with the IT alignment to the business. Then, a performance and capability analysis, strategic planning, tactic planning, execution, monitoring and control and finally new and corrective actions phase. In the case of the public university, the alignment of IT with university strategy was done as follows. In the Organizational context with being in alignment with of Brazils scientific development strategy. In fact, the Organizational objectives are the expansion of degree courses and infrastructures to improve teaching, research and extended learning activities. Regarding the IT objectives, the policy is integration between infrastructure and applications to satisfy expansion and innovation demands.

A social approach to IT governance is presented in (Martins et al., 2009). A conceptual model based on actor-network theory (ANT) is proposed. It helps resolve social issues in ITG.

The authors of (Bianchi & Sousa, 2016) studied the example of Portuguese universities. They confirm that the higher education institutions require a variety of information technology such as software, academic system, cloud applications, wireless network and e-learning platforms. This technology is used for supporting the activities of teaching, learning and management. To control this heterogeneous set of technologies, effective IT governance is necessary making use of structures, processes and relational mechanisms. To make IT Governance possible, in Portugal, institutions base their processes on COBIT, ITIL and ISO standards. In addition, to align with the strategy of the university, they define new structures responsible for defining roles and responsibilities like Steering committees. Those committees are composed of directors, managers, executives, and other people responsible for decision-making in the organization. Those structures work within processes that refers to planning and strategic decision making of IT based on practices from ITIL, COBIT or Balanced Scorecard, including techniques and appropriate tools to align business and IT for a good performance. What we can learn from the Portuguese experience is that it is not necessary to have too many committees. In practice, it is more relevant to focus, creating a committee to oversee business-IT alignment.

4.4 Brunei

The IT Governance is performed by the COBIT framework (Seyal et al., 2017). The data was obtained from interviews with the Directors and Chief Information Officers of four ICT centres. In these centres the weighted average maturity level of all studied ICTs ranges from 1.40 to 1.72.

4.5 Ecuador

The integration of ICT inside CEAACES (Council for Evaluation, Accreditation and Quality Assurance of Higher Education Institutions in Ecuador) is discussed in (Montenegro & Flores, 2016). They have adopted regulatory and legal framework essentially Organic and Common Laws, Statutory Instruments, Agreements, Decrees and General Norms. To apply the proposed ICT model inside CEAACES

three alignment scenarios were considered. The first one was the Corporative goals alignment in which COBIT processes are considered. In addition to IT goals alignment to ensure that information infrastructure, its processes and strategies are aligned with the corporative goals. Also, Business Processes Alignment to ensure that the processes are deployed in compliance with the whole corporative and IT goals. In (Valverde-Alulema & Llorens-Largo, 2016), the authors confirmed that ITs have strategic characteristics and must be a mandatory part of the overall planning of the universities by integrating IT planning aligned with institutional objectives. The proposed framework has adapted five processes in COBIT to the context of the university. The public university of Ecuador has been chosen as a case study. The COBIT processes ensure:

- The establishment and maintenance of the university's terms of reference of the university.
- the delivery of benefits of the university
- The optimization of the risks of the university.
- The optimization of the resources of the university.
- The transparency to the stakeholders.

The proposed framework establishes six possible maturity levels: Non-existent, Initial, Repeatable intuitive, Defined processes, Managed and measurable and Optimized.

4.6 Egypt

The IT governance was tested in the Central Laboratory for Agricultural Climate (CLAC), this university has no resource and supporter for public policies and issues; and has difficult quality education and research. The authors of (El-Morshedy et al., 2014) estimates that the laboratory has a capability level 1 and the domain shows two processes with capability level 3. To implement IT Governance Framework, they use the process capability model provided by COBIT 5 to measure the current (as-is) maturity of an IT -related processes. Each process will have a specific designation based on how well its practices achieve the intended purpose of this process. This process is one of the most governed processes in the laboratory. As a governmental entity, it considers the financial regulations very much and stick to it, which lead to a structured way in managing their budgets and especially IT allowances. We can learn from the Egyptian experience is that increasing the number of funded projects; increased the number of researchers and the rate of their business processing which led to more research papers and theses; and improved the co-workers' performances in general. We noticed also that the laboratory proved maturity in building an effective way of communicating between IT and the different stakeholders.

4.7 Gulf Region

The case study presents a Gulf University (Sahraoui, 2009). The study shows that the structures of shared governance that would enable faculty participation in the elaboration of ICT strategies are inexistent. Also, they noticed that decisions about ICT for administrative as well as for academic purposes are taken unilaterally by administrators who are sometimes only remotely connected to HEl. No standards presented in the paper and there is no indication that they have been used to establish the framework. The main objective of the university strategy was to implement the open source software in the university and the governance try to align with the objectives of the university. The lessons learned from the Gulf experience is that you need to win the battle with administrators get results of the IT governance establishment.

4.8 Indonesia

The information technology has been applied widely in Indonesia Higher Education Institutions for various services.

The IT Governance is performed by SIPERTI (Afriliana & Gaol, 2014). SIPERTI, a Higher Education Information System, is an online computer-based information system built with the aim to organize the academic data in the colleges in Indonesia. The maturity level of the studied university was graded Meet Expectation. The weighted average of IT balanced Scoreboard measurement was equal to 2.78

In (Maria et al., 2012), the ITG is performed by COBIT model framework version 4.1 in the institutions that want to give more attention to ITG. In Satya Wacana Christian University, the average of the whole IT process is at the maturity level of 2.79. The IT processes for supporting the business goals from the financial perspectives has been standardized, documented and well communicated. A conceptual model of ITG for Indonesian higher education is proposed in (Nugroho, 2014). The proposed model is based on the main principles that should exist in the process of governance with COBIT 5 framework guide. This model is used as a reference. The implementation of this model is not yet done. Mercu Buana University case study is described in (Sadikin et al., 2014). Moreover, the implementation of IT Governance in the university is still in the first stage of its development. The IT Governance is performed by COBIT framework an analysis of the IT assessment security maturity is presented in (Suwito et al., 2016). The paper proposes a combination of framework control objective from IT Governance COBIT with Management Service in ITIL v3 and ISO/IEC 27001.

4.9 Malaysia

The academic faculty and universities studied used the traditional reporting provides by the traditional cost management (TCM) system (Azizi Ismail, 2010). The main challenges facing universities and other educational organizations is the lack of strategic planning and policy (Ghavifekr & Hussin, 2011). The information system was developed in an uncoordinated manner, reflecting interests of

different departmental units, and a decision support system is almost non-existent (Ismail, 2008).

The IT Governance is performed by COBIT model framework in the institutions that begin give attention to ITG (Ahlan et al., 2014; Ajayi & Hussin, 2014). In the case of the public university, the alignment of IT with university strategy were done as by assuring that the organisations IT sustains and extends its strategies and objectives in aiming for optimum usage well felt by its managed users. Risk management addresses the safeguarding of IT assets, disaster recovery and continuity of operations. Resource management optimizes knowledge and IT infrastructure. Performance measurement would help the university tracks project delivery and monitors IT services. IT daily use needs benchmarks which can be used to guarantee improved services and value for IT investment

4.10 Poland

Business institution governance issues and IT governance problems are presented in (Pankowska, 2007). Also, consideration of virtual university and virtual university governance components as a supplement or even substitution of traditional education were discussed. Strategy management, IT architecture development and standardization of educational processes are necessary to create reliable virtual universities. The main advantages of standardization are essentially, transparency of educational activities, their compatibility and controllability.

4.11 South Africa

The situation of ITG in HEI in South Africa is discussed in (Johl et al., 2014). The department of higher education and training (DHET) has not yet introduced the requirement to implement any IT governance best practices into the existing HE governance framework through legislation. Also, none of the South African HEI that are renewing their statutes provide specifically for an IT governance framework despite the significant investment in IT. There is a regulation about corporate governance in HE and is not yet promulgated into law. It recommends that an IT governance framework will be required in terms of the amended regulation, but it does not require any specific framework. This may result in the adoption of different frameworks.

Another case of ITG in South Africa shows the role ITG in supporting teaching and learning techniques through eLearning strategies in the institutions of higher learning is discussed in (Ngqondi & Herselman, 2014). To investigate the role of ITG in supporting eLearning strategies a purposive case study was conducted in three institutions of higher learning (university A, university B and C). Findings indicated that embracing ITG in the institution of higher learning contributes effectively in using eLearning as a teaching and learning tool. Furthermore, they indicate that ITG practices are still challenged in the university setup since the execution of IT responsibilities are centrally managed and championed by IT unit.

4.12 Taiwan

Based on a survey of 71 schools listed on Taiwanese university directory (Hung et al., 2013b), the Information Security Governance for Universities in Taiwan is discussed. It showed that there is a high reliance on IT by schools, but the maturity of information security governance is generally deficient (39.7% of schools were rated Poor, 33.7% Needs improvement, and 26.5% Good).

4.13 Thailand

Aspects of ITG in Thai universities were explored in (Jairak & Praneetpolgrang, 2011). The ITG status in Thai universities is in the initial stage and not all IT projects can be aligned with university strategy. Despite of the importance lent to IT executives by many ITG performance measurements, many indicators are not used in association with this importance. This means there are still many gaps that need to be translated into ITG practice. Thai universities still have many obstacles in ITG implementation (IT executives are not clear in ITG principle, limited budget for starting ITG, lack of comprehension in ITG framework concepts, and ITG frameworks are not appropriate with their university context). Furthermore, IT executives also suggest that Thai universities should have to develop their own ITG framework that can be accepted from stakeholders. Even though, ITG improvement in universities has many obstacles, it can be solved and improved by co-operation from stakeholders

In (Jairak et al., 2015), sufficiency economy philosophy (SEP), a guideline to the development of Thai society, is used as a base for the design of IT Governance best practices. A set of 65 practices were used to deal with ITG issues in Thai universities. The practices were divided inti nine dimensions:

1. IT/business strategy alignment;
2. value creation from IT resources;
3. IT project investments;
4. IT budget management;
5. IT human resource management;
6. IT user management;
7. IT for university social responsibility;
8. Green IT; and
9. Quality assurance in IT department.

A framework for ITG for Thailand public universities was proposed and implemented since 2006 by using the Balanced Scorecard (BSC) tool (Praneetpolgrang et al., 2006). BSC is a multi-dimension tool to specify the operation and strategic management in all levels by linking objectives, program, project or activities, evaluation and strategies of the organization together. Financial and non-financial are both important measurements in BSC.

4.14 United Kingdom

In the UK, the Joint Information Systems Committee (JISC), a government funded body for driving innovation in UK education and research, has developed an IT governance framework that could assist HEIs (Barn et al., 2013; Coen & Kelly, 2007). The framework is built around five perspectives: governance, management, resources, structures and services. The toolkit which accompanies the framework contains a set of self-assessment questions and good practice guides to assist institutions in assessing the robustness of their approach to the management and governance of information systems and IT. JISC and the Leadership Foundation for Higher Education has commissioned a strategic ICT (SICT) toolkit that aims to provide a maturity measure of the extent of strategic alignment of an institution. This tool was used to do a survey of 65 senior managers at a UK institution (Barn et al., 2013). The study addresses strategic business and ICT alignment in higher education.

The results indicate that Enterprise Architecture and integration requirements between business and IS planning are central to increasing the maturity levels for universities engaged in business and IT alignment (BIA) but are not being adequately understood by the academy.

4.15 United States of America and Canada

EDUCASE published several works on ITG in HEI in the US (Krueger, 2009; Yanosky & Caruso, 2008). It realized a survey of 438 CIOs and other IT leaders at HEI in the USA and Canada (Yanosky & Caruso, 2008). Most respondents said that IT governance at their institutions stood at low to moderate levels of maturity (60% initial or repeatable maturity level). Regarding the use of a specific framework, 55% reported use of at least one framework such as COBIT, ITIL, or ISO standards in their ITG processes. This survey showed that the most cited driver for pursuing IT governance is aligning IT goals with institutional goals (74%). In (Council III, 2006), the case of South Louisiana Community College is detailed. It shows that COBIT is used as a framework for ITG. In (Winston, 2010), case studies of three public US universities were discussed. From one hand, the governance at the University of Memphis and Indiana State University were similar in that each had an established level of maturity, a long-term CIO, and was framed around a committee structure with broad based campus participation that informed decision making. In the other hand, the governance at the University of Tennessee, Knoxville was not based on the committee structure, had a history of instability, and a high turnover in CIOs.

A survey of 505 US HEI (Liu et al., 2016) was conducted to explain the relationship between IT governance, security outsourcing, and cybersecurity breaches. It appears that centralized IT governance in a university is associated with fewer cybersecurity breaches, and that the effect is much stronger when the university has a more complex IT environment. Another finding of this survey is that outsourcing information security leads to a lower probability of encountering cybersecurity breaches. The risk management effort related to IT is discussed in (Bichsel & Feehan, 2014). This study showed that institutions using a standard

framework (COBIT, ISO…) have more advances in their risk management strategies Another study (Dlamini, 2013) demonstrated the role of CIO in higher education institution. In fact, such a position inside the university is no longer related to technical issues only, but also has a strategic effect on the institution mission. A CIO need to have multidimensional personalities, diverse work experience and a higher education background.

4.16 Generic Category

Various studies showed the importance of ITG for higher education institutions (Kilic & Metin, 2012; Knahl, 2013; Kwon, 2008; Mirski & Kilian, 2012). These works highlighted the fact that using framework standards such as COBIT is a good practice to implement.

5 Discussion

To the best of author´s knowledge the only systematic literature review available in the literature is the one by Valverde-Alucema (Valverde-Alulema et al., 2017). The difference between this work and the one presented in this paper is twofold. The first is the focus on the previous paper, which is aimed to review project portfolio and not IT Governance as a whole. The second is the results of the SLR process that are constructed towards the demonstration of the importance of IT Governance and not on the effective results of the initiatives performed and illustrated in the papers presented in the study.

However, there are also other papers not reported in this paper worth to mention in this discussion section. For instance, there are some recent efforts strictly focussed on Data Governance (Mlangeni & Ruhode, 2017), a nascent topic that is not tackled by any of the papers reported in the SLR. In the Islamic world, a recent study (Al-rahmi, Zeki, Alias, & Saged, 2017) portraits the usage of IT in organizations, but without given any specifics for HEIs. In Indonesia, the paper (Wiradinata, 2017) is reporting one of the issues of every IT Governance deployment, the cascading of the model into specific objectives. Regarding Taiwan, in the paper by (Hung, Hwang, & Liu, 2013a) it is reported the construction of an Information Security Governance Maturity model. Finally, in Malaysia, authors present a paper devoted to present a paper on an IT governance framework for achieving the development of academic programme (Musa et al., 2014). This approach is more specific and although is not covering the HEI as a whole, efforts are more than related to the work presented in this paper.

To sum up, and as reported earlier, this paper presents a view from ITG initiatives in HEIs worth to note in the design of specific ITG frameworks for this organizations. This is the cornerstone for a specific framework to lead ITG in a given country.

6 Conclusion

The literature review shows a mixed situation of ITG in HEI. Some countries have the support of top level government in introducing ITG in higher education institutions such as Ecuador, South Africa or the UK by adopting regulatory frameworks and common laws. Countries such as the US, Australia, Thailand or Malaysia have a well spread culture of IT governance. The different case studies presented in this review show that there is no consensus on the ITG framework or standard to use in HEI. From one hand, most institutions are implementing COBIT, ITIL or ISO best practices. In the other hand some counties have developed their own framework such as the UK solution. The lessons learnt from the various case studies are summarized in the following best practices:

- Establishing a committee structure for IT assets
- Effective communication between the IT, the business and the different stakeholders
- Alignment of IT strategy with the institution strategy
- Use of balanced scorecard

As a future work, we need to focus on how reach a consensus on the ITG framework for HEI. The implementation of the lessons learnt from the various case studies can lead to this consensus, but we need to find the limitations on these actions. The level of maturity of a HEI is very important to identify the actions to be taken. This SLR is a starting point for the definition, design and implementation of a common ITG framework for the Tunisian universities.

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