



# The Internal Control System In The Institutional Management Of The Ujat Research Process

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## ABSTRACT

This research aimed to evaluate "*If the Internal Control System (ICS) is effective in the Institutional Management (IG) of the research process of the Universidad Juárez Autónoma de Tabasco (UJAT)*". Previous studies indicate that *ICS* in some Higher Education Institutions (HEIs) have not been effective in the performance of their *IG*, due to deficiencies in their design, implementation, updating, supervision and evaluation.

The research methodology is quantitative, non-experimental, cross-sectional, descriptive, correlational-causal, carried out through interviews with staff, review of university legislation, information and documentation to know the process. The questionnaire applied by means of a survey to the sample population was developed based on the five components and seventeen principles of the "Internal Control - Integrated Framework" of the COSO 2013 model, to evaluate the effectiveness of an *ICS*. Its reliability is validated by means of Cronbach's Alpha Coefficient, analyzing the data collected and the contrast of the general hypothesis through SWOT analysis and descriptive and inferential statistics, using Pearson's Correlation Coefficient to establish parameters of significance and correlation of the components of the *ICS* and the *GI* of the process.

The results of the hypothesis test indicate that the *ICS* in the *IG* of the activities of the investigated process presents a significant average overall effectiveness, to achieve its strategic objectives of operation, information and compliance, with a significant positive correlation due to the weaknesses determined, issuing recommendations as an area of opportunity to strengthen its effectiveness, as well as, Subsequent studies of the subject.

**Keywords:** Internal Control, Institutional Management, Components, Principles, Effectiveness.

## Introduction

Internal Control in the Management of Higher Education Institutions (HEIs) is a process that must be present in the daily activities of the substantive functions (teaching, research, dissemination of culture and linkage) and adjectives (support), which facilitate their operation, development and *institutional performance*. The purpose of *Internal Control* is to contribute to the quality, excellence and competitiveness of the services offered to the university community and to the changing demands demanded by the economic, social, cultural, political, scientific, technological environments, etc.

HEIs as formal organizations should not be exempt from adequate *Internal Control*, even respecting their own particularities, *Institutional Management models* and functionality that distinguish them. There is a great interest on the part of the university community of the HEIs, government authorities and society in general, to know the degree of efficiency, effectiveness and transparency with which the senior managers and governing bodies of these institutions manage the financial, human, material, technological resources, etc., to fulfill the mission, vision, institutional objectives and goals established in their strategic development plans and budgets, related to their substantive functions for which they were constituted.

This concern and demand have led to a series of investigations at the global level (without finding any from the UJAT), related to *Internal Control Systems (ICS)*, in order to evaluate their design, implementation, maintenance, continuous improvement and supervision in their *institutional management*. According to the

results of sixteen studies carried out in different HEIs around the world, the *ICS*, in some HEIs, have not contributed effectively to the *performance of their management*.

## Development

### Problem statement

The results of the research carried out have shown that Internal Control has not effectively affected the *management performance of HEIs*, because the components (control environment, risk assessment, control activities, information and communication, supervision activities and their relevant principles), which make up the *ICS*, they are not well implemented or do not work in an integrated way, they have deficiencies in their design and implementation, they are in process, they lack supervision and evaluation (Rodríguez, 2009; Kumeh, 2012; Arencibia et al., 2013; Contreras & Díaz, 2013; Duch, et al., 2014; García, et al. 2015; Morell, Fernández, & Cedeño, 2017; Xia Liang, 2017); observing the absence of some principles of its components or because they are focused on accounting aspects (Arencibia, et al., 2013; Govea, 2017) or financial (Akindel & Oladipo, 2013). Problems that have arisen due to lack of observance of the regulations that regulate it (Arencibia et al., 2013), the lack of commitment, interest, support, responsibility, competence, knowledge, and experience on the subject by its authorities and the personnel involved in its process (Rodríguez, 2009; García et al., 2015), coupled with the lack of a responsible area that enhances its implementation and continuous improvement; in addition to the poor supervision, evaluation, performance, and development of internal audits (Rodríguez, 2009; Martínez & Campos, 2012).

This situation has had an impact on the economy, efficiency, and effectiveness of the performance of the strategic objectives and goals of its substantive functions (Rodríguez, 2009; Contreras & Díaz, 2013; Cambier, 2015), the reliability, reasonableness, and timeliness of internal and external information and communication, which contributes to appropriate and timely decision-making by users, as well as adequate accountability and transparency (Rodríguez, 2009), and compliance with the laws that regulate them; that contribute to the performance of responsible and effective management in the achievement of its mission, vision, objectives and goals of its strategic development plans, to optimize the financial, human and material resources of its budgets (Rodríguez, 2009; Contreras & Díaz, 2013; Valdiviezo & Espinoza, 2013; Cambier, 2015; García et al., 2015), which are authorized for these purposes and thus meet the changing demand of the economic, social, cultural, and political sectors; there is still a long way to go in the culture of Internal Control in the management of these institutions (Rodríguez, 2009; Fernández, Martínez & Campos, 2012; Kumeth, 2012; Arencibia et al., 2013; Contreras and Díaz. 2013; García et al., 2015; Xia Liang, 2017).

## Research Questions and Objectives

**Table 1. Research Questions and Objectives**

Questions	Objectives
<b>General.</b> Is the <i>Internal Control System</i> effective in the <i>Institutional Management</i> of the UJAT investigation process?	<b>General</b> To evaluate the effectiveness of the <i>Internal Control System</i> in the <i>Institutional Management</i> of the substantive activities of the UJAT research process.
<b>Specific:</b> Are the five components of control environment, risk assessment, control activities, information and communication, and supervisory activities and their seventeen relevant related principles present in the Internal Control of Institutional Management of the UJAT investigation process?	<b>Specific:</b> To identify whether the five components of control environment, risk assessment, control activities, information and communication, and supervisory activities and their seventeen related relevant principles are present in the Internal Control of Institutional Management of the UJAT's research process.
Are the five components and their seventeen relevant principles in the Internal Control of Institutional Management of the UJAT research process in operation?	To review whether the five components and their seventeen related relevant principles are in operation in the Internal Control of the Institutional Management of the UJAT investigation process.
Do the five components work in an integrated way, in the Internal Control of the Institutional Management of the UJAT research process?	To determine if the five components work in an integrated manner in the Internal Control of the Institutional Management of the UJAT investigation process.
Are there weaknesses and strengths in the components and their relevant principles in the Internal Control of the Institutional Management of the UJAT research process?	To analyze whether there are weaknesses and strengths in the components and their relevant principles in the Internal Control of the Institutional Management of the UJAT research process.
Does Internal Control contribute to the achievement of the objectives of operation, information and compliance in the Institutional Management of the UJAT investigation process?	To support whether the Internal Control contributes to the achievement of the objectives of operation, information and compliance in the Institutional Management of the UJAT investigation process.

Source: Authors.

## Justification

It is considered pertinent to carry out research on the effectiveness of the *SCI* of the research process in the UJAT, as an area of opportunity and improvement that contributes to strengthening the process of *Internal*

*Control* in its *Institutional Management*, because no studies related to the subject have been carried out in this House of Studies. Research that will have the purpose of determining the strengths and weaknesses and effectiveness of the *ICS* in the *Institutional Management* of the investigated process, to identify areas of opportunity and suggest recommendations for improvement that strengthen and contribute to effective and efficient management, create awareness of the importance of the culture of *Internal Control* in the authorities, administrative and teaching staff and in general in the university community.

### Theoretical framework

The research was carried out based on the Internal Control – Integrated Framework, of the Committee of Sponsoring Organizations of the Treadway Commission (2013), known as the COSO 2013 model, recognized globally as one of the best practices in this area. It consists of five components with seventeen principles that are detailed below:

**Table 2. Components and principles**

Components	Principles
<b>Control environment.</b> A set of rules, processes and structures that are the basis of the Internal Control System in the organization. The board of directors and senior management mark the importance of internal control and the standards of conduct expected within the entity. Management reinforces expectations about internal control at different levels of the organization.	<ol style="list-style-type: none"> <li>1. The organization demonstrates a commitment to integrity and ethical values.</li> <li>2. The board of directors demonstrates independence from management and exercises responsibility for monitoring the performance of the <i>ICS</i>.</li> <li>3. Management establishes, with the supervision of the board of directors, the structures, reporting lines, levels of authority, and responsibilities to achieve the objectives.</li> <li>4. The organization demonstrates commitment to attracting, developing, and retaining competent professionals to achieve the organization's goals.</li> <li>5. The organization defines the responsibilities of individuals at the internal control level to achieve objectives and accountability.</li> </ol>
<b>Risk assessment.</b> It is a dynamic and iterative process to identify and mitigate the risks associated with the achievement of operational, reporting and compliance objectives. They are evaluated according to their established tolerance levels.	<ol style="list-style-type: none"> <li>6. The organization defines clear objectives to identify and assess related risks.</li> <li>7. The organization identifies, analyzes, and manages risks to achieve goals at all levels.</li> <li>8. The organization considers the likelihood of fraud when assessing risks to achieve goals.</li> </ol>
Components	Principles
Risk is the possibility of a negative event that affects the achievement of objectives. Institutions face different internal and external risks. Its evaluation is the basis for determining its management.	The organization identifies and assesses significant changes that could significantly affect the <i>ICS</i> .
<b>Control activities.</b> These are actions established through policies and procedures to guarantee the instructions of management and mitigate risks with a potential impact on the objectives. They are executed at all levels of the entity and in the stages of business and technological processes. They are preventive or detection, manual or automatic.	<ol style="list-style-type: none"> <li>9. The organization defines and develops control activities to mitigate risks to acceptable levels to achieve the objectives.</li> <li>10. The organization defines and develops entity-level control activities over technology to achieve the objectives.</li> <li>11. The organization establishes control activities through policies and procedures for its practice.</li> </ol>
<b>Information and communication.</b> It is necessary in the entity to carry out the responsibilities of internal control by personnel and achieve objectives.	<ol style="list-style-type: none"> <li>12. The organization obtains, generates, and uses relevant internal and external information and quality that supports the functioning of internal control.</li> <li>13. The organization communicates internal information, including goals and responsibilities to all levels of the organization to support the operation of the <i>ICS</i>.</li> <li>14. The organization communicates to external stakeholders the key aspects that affect the functioning of internal control.</li> </ol>
<b>Supervisory activities.</b> They are continuous and independent or combined evaluations to determine whether each of the five components of internal control to comply with the principles are present and function properly.	<ol style="list-style-type: none"> <li>15. The organization selects, develops, and conducts ongoing and/or independent assessments of whether the components of the <i>ICS</i> are present and functioning.</li> <li>16. The organization assesses and communicates internal control deficiencies in a timely manner to those responsible and implements corrective actions, including senior management and the board of directors.</li> </ol>

Source: Authors.

The "Framework" allows the senior management of organizations to design, implement, maintain in operation, supervise and evaluate the effectiveness of the *Internal Control Systems*, to meet their operational, information and communication objectives and compliance with the laws that regulate them, adapting to changes in their economic, operational and competitive environment in their priorities and business models.

In Mexico, the criteria and control mechanisms are regulated in the Political Constitution of the United Mexican States (Chamber of Deputies of the Honorable Congress of the Union, 2018) and the agreement establishing the Integrated Framework of Internal Control (Superior Audit of the Federation and Ministry of Public Function, 2014) adopted from the COSO 2013 model. and adapted to the particular characteristics of the federal, state and municipal governments of Mexico, including the autonomous bodies, with the obligation to implement it in the organizational structures of the public administration in the three levels of government, based on the agreements of each state and the state Fiscal Responsibility Laws. At the time of the issuance of this document, the UJAT has implemented this SCI, only in the central administration, pending implementation in the twelve academic divisions of its organizational structure.

### Methodology

The research carried out is quantitative, with a descriptive, correlational and explanatory scope. The research design is non-experimental, cross-sectional, descriptive, correlational-causal, carried out through interviews with the personnel responsible for the process studied, the review of university legislation, information and documentation to know the *Institutional Management* of the process. The survey is selected as an instrument, elaborating a questionnaire adapted to the five components and the seventeen principles to evaluate the effectiveness of an *ICS* of the COSO 2013 model, in the *Institutional Management* of the investigated process, applied to the sample of the selected population, to obtain its perception, validating its reliability by means of Cronbach's Alpha Coefficient. The analysis of collected data is carried out through descriptive statistics and the strategic tool of the SWOT analysis matrix. The general hypothesis is contrasted by inferential statistics, using Pearson's Correlation Coefficient, with parameters of significance and correlation of the components of *Internal Control* and *Institutional Management* of the evaluated research process.

### Research variables

The variables related to the study of the problem under investigation are:

X1 = *Internal Control* (Independent Variable) and Y1 = *Institutional Management* (Dependent Variable). The conceptualization of the research constructs are the following:

**Table 3. Conceptualization of the variables**

Variable	Concept
<b>Internal control</b>	"It is the process, carried out by the board of directors, management and other staff, designed to provide reasonable assurance in the achievement of objectives related to operations, reporting and compliance" ( <i>Committee of Sponsoring Organizations [COSO] of the Treadway Commission</i> , 2013, p.3).
	A process established by the governing body of a company or institution and management, which aims to provide reasonable assurance as to compliance with objectives related to operation, reporting, and compliance. This process is made up of the five components: Control Environment, Risk Assessment, Control Activities, Information and Communication and Monitoring. (Farías, 2017, p. 48).
	The process designed, implemented and maintained by those charged with governance, management and other personnel, in order to provide reasonable assurance on the achievement of the entity's objectives relating to the reliability of financial information, the effectiveness and efficiency of operations, as well as compliance with applicable legal and regulatory provisions. The term "controls" refers to any aspect related to one or more components of internal control (International Standards on Auditing, 2022, p.315).
<b>Institutional management</b>	The execution and monitoring of the mechanisms, actions and measures necessary to achieve the objectives of the institution, implying, therefore, a strong commitment of its actors to the institution and also to the values and principles of effectiveness and efficiency, from this point of view it is understood that the conduct of any institution involves applying management techniques for the development of its actions and the achievement of its objectives. (Barbarán 2013, p.50)
	<b>Concept</b>
	"A process that includes certain activities and job functions that directors, administrators, or managers must perform with the personnel in their charge, in order to achieve the organization's objectives" (Chirca & Reyes, 2014, p. 40).
	The Ministry of National Education of Colombia (as cited in Páez, 2015), conceptualizes <i>Institutional Management</i> as "a set of actions that the members of an institution carry out to make feasible the objectives and goals established in the institutional educational project and in the improvement plan" (p. 162).

Source: Authors.



**Table 4. Operationalization of the variables**

Management/ Control	Variables: Internal Control / Institutional Management			Reagents Proposed
	Dimensions	Indicators	%	
Strategic	Environment of control	1. Integrity and ethical values. 2. Supervisory responsibility. 3. Structure, levels of authority, and responsibilities. 4. Commitment to attracting, developing, and retaining competent professionals. 5. Responsibility for the achievement of objectives.	40	32
	Evaluation of risks	6. Define clear objectives. 7. Identify, analyze, and manage risks. 8. Assess the risk of fraud. 9. Identifies and assesses significant changes in the ICS.	15	13
Operation	Activities of Control	10. Develops control activities to mitigate risks. 11. Develops control activities over technology. 12. Establishes control activities through policies and procedures.	15	8
	Information and communication	13. Obtains, generates and uses relevant internal and external information. 14. Communicate internal information. 15. External communication.	15	11
Evaluation	Activities of supervision	16. Performs continuous and/or independent evaluations on the components of the ICS, to know if they are present and in operation. 17. Assesses and communicates ICS deficiencies and implements corrective actions.	15	11

Source: Adapted from "Research Methodology" by R. Hernández, C. Fernández and P. Baptista, 2014, Operationalization: the transition from variable to item or value, 9.2, p. 211. All rights reserved 2014, by McGraw-Hill / Interamericana Editores, S.A. DE C.V., "Learning to Investigate Series. Module 5 The Research Project" by M. Tamayo, 1999, Operationalization of the variables, 1.7.4., p. 209. Arfo Editores, LTDA.

## Hypothesis

The research hypothesis of this study is correlational and causal relationships.

H1. The *Internal Control System* in the *Institutional Management* of the UJAT investigation process is effective, because it has a favorable impact on the achievement of its operational, information, and compliance objectives.

Hypothesis that demonstrates the cause-and-effect relationship between the variables to test and confirm the validity and positive effect of the independent variable in the achievement of the objectives of the dependent variable and the acceptance of the *Framework* used to test its reliability and strength, otherwise it is rejected and the *Framework* is not reliable in the research topic. Based on Hernández et al, (2014, p. 104-106, 108 and 110).

## Research Design

It is non-experimental, because the variables are not manipulated to induce a desired result. It is descriptive, because it includes the specification of the concepts, dimensions, relevant principles of the variables. The design is correlational because the cause-and-effect relationship is established, with the objective of investigating and verifying whether the independent variable *Internal Control* (cause) effectively affects the dependent variable *Institutional Management* (effect) in the achievement of the objectives of operation, information and compliance of the research process studied at the *HEI* sampled, through the numerical measurement that is carried out through the analysis of the statistical procedure of the data collected and determined findings, to respond to the affirmative questions related to the problem posed of the deficiencies of *Internal Control* in the *Institutional Management of Higher Education Institutions* that validate the established hypothesis. Based on the following authors: Wentz, 2014; McLaren, 2014; Creswell, 2013; Hernández-Sampieri et al., 2013; Kalaian, 2008; Liu, 2008 and Tucker, (2004) (as cited in Hernández et al., 2014, p. 128 and 154); and Hernández et al., (2014, p. 128, 152, 155 and 157).

## Universe selection and sample size calculation

The unit of analysis of the quantitative sample is made up of the administrative staff (directors, middle and operational managers) and research professors related to the activities of the process studied, selected under the probabilistic method because they all have the same possibility of being included, calculated with the simple random method with 95% confidence and 5% error. using the Decision Analyst STATS<sup>TMTM</sup>2.0 software for statistical calculations. Based on Hernández et al., (2014, p. 170 -175). The sample size determined is as follows:

**Table 5. Sample of the professors, researchers and administrative staff surveyed**

Criteria	Research professors	Administrative staff
Size of the universe:	50	12
Maximum Acceptable Error:	5%	5%
Estimated percentage of the sample:	50%	50%
Desired level of confidence:	95%	95%
Sample size	44	12

Source: Sample size: (represented by 50 research professors and 12 administrative people from the universe, with 95% confidence and 5% error). From "Research Methodology by R. Hernández, C. Fernández & P. Baptista, 2014, Calculation of sample size, 3, p. 179. Copyright 2014, by McGraw-Hill / Interamericana Editores, S.A. De C.V.

### Selection and design of analysis instruments

A diagnosis is carried out through interviews with the officials responsible for the process, to identify the components and principles of the COSO 2013 model, in the activities, regulations, *Internal Control policies* and documentation of the *Institutional Management* of the substantive research process, which served to formulate 75 closed affirmative questions with methods that operate the measurement, evaluation and analysis of the variables *Internal Control* (independent) and *Institutional Management* (dependent) and the effectiveness of *Internal Control* in *Institutional Management*, which is measured with the "Illustrative Tool to Evaluate the Effectiveness of an *Internal Control System*" (Spanish version) of the COSO 2013 Model.

To measure the statements of each question, the ordinal Likert rating scale method is used for quantitative analysis, with five answer alternatives coded with ranges of: 1) strongly disagree (TED), 2) disagree (ED), 3) neither agree nor disagree (NAND), 4) agree (DA) and 5) strongly agree (TDA). Its reliability and validity are evaluated with the Cronbach's Alpha Coefficient, which is submitted and contrasted with the review, judgment and professional criteria of other researchers and experts in the field. Based on Hernández et al., (2014, p. 199-210, 254, 258).

### Data collection

Data are collected through surveys, applying the questionnaires to people in the sampled population in their workplaces. The information obtained was analyzed by means of a data matrix with the analysis software "Statistical Package for the Social Sciences (SPSS)" version 23, developed by the University of Chicago. Based on Hernández et al., (p. 271, 233, 258).

## Results

### Identifying Weaknesses and Strengths

The identification of the weaknesses and strengths of the *Internal Control* in the *Institutional Management* of the investigated process was carried out using the SWOT data analysis matrix, determining 63% and 35% of weaknesses and 65% and 37% of strengths, of the 75 and 74 questions answered by the respondents, see tables 6 and 7. which represent, from the statistical data according to tables 8 and 9, 36% and 9% of strengths and 16% and 19% of weaknesses of the total of 295 and 134 indicators applied to the professors, researchers and administrative staff surveyed, respectively.

**Table 6. Weaknesses and strengths of IQ based on the perception of research professors**

Dimension	Weaknesses			Strengths			Total		
	Frecuency	Total %	Dimension %	Frecuency	Total %	Dimension %	Frecuency	Dimension %	Total %
Control Environment	18	38%	56%	14	50%	44%	32	100%	43%
Risk assessment	10	21%	77%	3	11%	23%	13	100%	17%
Control activities	5	11%	63%	3	11%	38%	8	100%	11%
Information and communication	5	11%	45%	6	21%	55%	11	100%	15%
Monitoring activities	9	19%	82%	2	7%	18%	11	100%	15%
Total, Internal Control	47	100%	63%	28	100%	37%	75	100%	100%

Source: Authors. Weaknesses and strengths of Internal Control in the *Institutional Management* of the process of the substantive research function, based on the perception of research professors determined with the strategic tool of the data analysis matrix called SWOT (Strengths, Weaknesses, Opportunities, and Threats).

**Table 7. Weaknesses and strengths of the IC based on the perception of the administrative staff**

Dimension	Weaknesses			Strengths			Total		
	Frecuency	Total %	Dimension %	Frecuency	Total %	Dimension %	Frecuency	Dimension %	Total %
Control Environment	3	12	9%	29	60%	91%	32	100%	43%
Risk assessment	4	15%	31%	9	19%	69%	13	100%	18%
Control activities	2	8%	29%	5	10%	71%	7	100%	9%
Information and communication	6	23%	55%	5	10%	45%	11	100%	15%
Monitoring activities	11	42%	100%	0	0%	0%	11	100%	15%
Total, Internal Control	26	100%	<b>35%</b>	48	100%	<b>65%</b>	74	100%	100%

Source: Authors. Weaknesses and strengths of Internal Control in the *Institutional Management* of the process of the substantive investigation function, based on the perception of the administrative staff determined with the strategic tool of the data analysis matrix called SWOT (Strengths, Weaknesses, Opportunities, and Threats).

### Hypothesis Testing

The analysis and contrast of the hypothesis on the perception of the effectiveness of *Internal Control* in the *Institutional Management* of the investigated process is 31% by the research professors and 23% by the administrative staff, confirming its effectiveness with the measures of general central tendency of the mode with a value of 4, median with values of 4 and 3.56 and mean with a value of 3.50. for both cases and a favorable qualitative rating of 4. I agree. See Tables 8 and 9.

**Table 8. Level of effectiveness of IQ in the GI of the research process based on the perception of research professors**

Dimension		FUCK		Frequencies						Core measures			Qualificat ion Qualitati ve
		Weakness	Fortress	TE D	AN D	NAN D	ALS O	TD A	Total	Fashi on	Medi an	Med ia	
1. Control environment.	Frecuency %	18	14	0	7	15	20	2	76	4	3.5	3.39	Neutral
	Dimension %	24%	18%	0%	9%	20%	26%	3%	100%				
	% Total	6%	5%	0%	2%	5%	7%	1%	26%				
2. Risk assessment	Frecuency %	10	3	0	4	19	19	2	57	3	3	3.43	Neutral
	Dimension %	18%	5%	0%	7%	33%	33%	4%	100%				
	% Total	3%	1%	0%	1%	6%	6%	1%	19%				
3. Control activities.	Frecuency %	5	3	2	5	18	16	3	52	3	3	3.30	Neutral
	Dimension %	10%	6%	4%	10%	35%	31%	6%	100%				
	% Total	2%	1%	1%	2%	6%	5%	1%	18%				
4. Information and communication	Frecuency %	5	6	1	2	17	22	2	55	4	4	3.50	I agree
	Dimension %	9%	11%	2%	4%	31%	40%	4%	100%				
	% Total	2%	2%	0%	1%	6%	7%	1%	19%				
5. Supervisory activities.	Frecuency %	9	2	0	7	18	15	4	55	3	3	3.36	Neutral
	Dimension %	16%	4%	0%	13%	33%	27%	7%	100%				
	% Total	3%	1%	0%	2%	6%	5%	1%	19%				
Total, Internal Control	Frecuency %	47	28	3	25	87	92	13	295	<b>4</b>	<b>4</b>	<b>3.50</b>	<b>I agree</b>
	Dimension %	16%	9%	1%	8%	29%	31%	4%	100%				
	% Total	<b>16%</b>	9%	1%	8%	29%	<b>31%</b>	4%	100%				

Source: Authors. Weaknesses and strengths determined with the strategic tool of the data analysis matrix called SWOT (Strengths, Weaknesses, Opportunities, and Threats). Frequencies and measures of central tendency and variability, computed through statistical analysis software called "Statistical Package for the Social Sciences (SPSS)", version 23

**Table 9. Level of effectiveness of the IC in the GI of the research process based on the perception of the administrative staff**

Dimension		FUCK		Frequencies						Core measures			Qualificat ion Qualitativ e
		Weakn ess	Fortre ss	TE D	AN D	NAN D	ALS O	TD A	Tot al	Fashi on	Medi an	Med ia	
1. Control environm ent.	Frequen cy %	3	29	0	1	4	3	4	44	3	3.86	3.83	I agree
	Dimensi on	7%	66%	0%	2%	9%	7%	9%	100 %				
	% Total	2%	22%	0%	1%	3%	2%	3%	33%				
2. Risk assessment t.	Frequen cy %	4	9	0	1	3	8	0	25	4	3.64	3.58	I agree
	Dimensi on	16%	36%	0%	4%	12%	32%	0%	100 %				
	% Total	3%	7%	0%	1%	2%	6%	0%	19%				
3. Control activities.	Frequen cy %	2	5	0	0	4	7	1	19	4	3.73	3.75	I agree
	Dimensi on	11%	26%	0%	0%	21%	37%	5%	100 %				
	% Total	1%	4%	0%	0%	3%	5%	1%	14%				
Dimension		FUCK Weakn ess	Fortre ss	TE D	AN D	NAN D	ALS O	TD A	Tot al	Fashi on	Core measures Medi an	Medi cal	Qualificat ion Qualitativ e
4. Informatio n and commu nication	Frequen cy %	6	5	0	1	3	8	0	23	4	3.64	3.58	I agree
	Dimens ion	26%	22%	0%	4%	13%	35%	0%	100 %				
	% Total	4%	4%	0%	1%	2%	6%	0%	17%				
5. Supervisory activities.	Frequen cy %	11	0	1	3	3	5	0	23	4	3.13	3	Neutral
	Dimens ion	48%	0%	4%	13%	13%	22%	0%	100 %				
	% Total	8%	0%	1%	2%	2%	4%	0%	17%				
Total, Internal Control	Frequen cy %	26	48	1	6	17	31	5	134	<b>4</b>	<b>3.56</b>	<b>3.50</b>	<b>I agree</b>
	Dimens ion	19%	36%	1%	4%	13%	23%	4%	100 %				
	% total	<b>19%</b>	<b>36%</b>	1%	4%	13%	<b>23%</b>	4%	100 %				

Source: Authors. Weaknesses and strengths determined with the strategic tool of the data analysis matrix called SWOT (Strengths, Weaknesses, Opportunities, and Threats). Frequencies and measures of central tendency and variability, computed through statistical analysis software called "Statistical Package for the Social Sciences (SPSS)", version 23.

The general result of the hypothesis test carried out with Pearson's Correlation Coefficient (because they are quantitative variables), according to the inferential analysis is positive with 99% and 95% confidence level, because the levels of significance are 0.000 less than 0.01 and 0.01 to 0.04 less than 0.05, as presented in tables 10 and 11. This result is confirmed by the level of validity and reliability of the questionnaires applied with values of .980 and .987, higher than those determined with Cronbach's Alpha Coefficient of .80, indicating that there is no redundancy of indicators in the measurement of the five components of the research variables. See table 12.

The research hypothesis at the significance level of 0.01 and 0.05 is accepted. H1. The Internal Control System in the Institutional Management of the University's research process is effective, because it has a favorable impact on the achievement of the objectives of operation, information and compliance. These objectives have



been diminished by the reduction of the financial resources of the budget granted to the University by the federal and state governments in recent years, influencing the mood of research professors and their perception of Internal Control in the Institutional Management of the University's research process.

**Table 10. Correlations of the components of the variables based on the perception of the research professors**

<i>Dimension</i>	<i>Data</i>	<i>Control environment</i>	<i>Risk assessment</i>	<i>Control activities</i>	<i>Information and communication</i>	<i>Monitoring activities</i>
<i>Control environment</i>	<i>Pearson correlation</i>	1	.772**	.615**	.656**	.655**
	<i>Significance. (bilateral)</i>		0.000	0.000	0.000	0.000
	<i>Sample</i>	44	44	44	44	44
<i>Risk assessment</i>	<i>Pearson correlation</i>	.772**	1	.632**	.607**	.594**
	<i>Significance. (bilateral)</i>	0.000		0.000	0.000	0.000
	<i>Sample</i>	44	44	44	44	44
<i>Control activities</i>	<i>Pearson correlation</i>	.615**	.632**	1	.476**	.586**
	<i>Significance. (bilateral)</i>	0.000	0.000		0.001	0.000
	<i>Sample</i>	44	44	44	44	44
<i>Information and communication</i>	<i>Pearson correlation</i>	.656**	.607**	.476**	1	.705**
	<i>Significance. (bilateral)</i>	0.000	0.000	0.001		0.000
	<i>Sample</i>	44	44	44	44	44
<i>Monitoring activities</i>	<i>Pearson correlation</i>	.655**	.594**	.586**	.705**	1
	<i>Significance. (bilateral)</i>	0.000	0.000	0.000	0.000	
	<i>Sample</i>	44	44	44	44	44

Source: Authors. Correlation of the components of *Internal Control* and *Institutional Management* of the research process, calculated with the Pearson Correlation coefficient based on the statistical analysis program called "Statistical Package for the Social Sciences (SPSS)", version 23, with the results of the perception of the surveyed research professors. \*\*. The correlation is significant at the 0.01 level (bilateral).\*. The correlation is significant at the 0.05 level (bilateral).

**Table 11. Correlations of the components of the variables based on the perception of the administrative staff**

<i>Dimension</i>	<i>Data</i>	<i>Environment Control</i>	<i>Risk assessment</i>	<i>Control activities</i>	<i>Information and communication</i>	<i>Monitoring activities</i>
<i>Control environment</i>	<i>Pearson correlation</i>	1	.814**	.639*	.682*	.845**
	<i>Significance. (bilateral)</i>		0.001	0.025	0.015	0.001
	<i>Sample</i>	12	12	12	12	12
<i>Risk assessment</i>	<i>Pearson correlation</i>	.814**	1	.602*	.593*	.651*
	<i>Significance. (bilateral)</i>	0.001		0.039	0.042	0.022
	<i>Sample</i>	12	12	12	12	12
<i>Control activities</i>	<i>Pearson correlation</i>	.639*	.602*	1	.602*	0.560
	<i>Significance. (bilateral)</i>	0.025	0.039		0.039	0.058
	<i>Sample</i>	12	12	12	12	12
<i>Information and communication</i>	<i>Pearson correlation</i>	.682*	.593*	.602*	1	0.391
	<i>Significance. (bilateral)</i>	0.015	0.042	0.039		0.209
	<i>Sample</i>	12	12	12	12	12
<i>Monitoring activities</i>	<i>Pearson correlation</i>	.845**	.651*	0.560	0.391	1
	<i>Significance. (bilateral)</i>	0.001	0.022	0.058	0.209	
	<i>Sample</i>	12	12	12	12	12

Source: Authors. Correlation of the components of *Internal Control* and *Institutional Management* of the research process, calculated with the Pearson Correlation coefficient based on the statistical analysis program called "Statistical Package for the Social Sciences (SPSS)", version 23, with the results of the perception of the surveyed administrative staff. \*\*. The correlation is significant at the 0.01 level (bilateral).\*. The correlation is significant at the 0.05 level (bilateral).

**Table 12. Statistics on the reliability of the questionnaires applied in the surveys**

Questionnaire	Cronbach's alpha	Cronbach's alpha based on standardized elements	Number of items
Survey applied to research professors	.980	.980	75
Survey applied to administrative staff	.987	.986	74

Source: Authors. Calculated with Cronbach's Alpha Coefficient, based on the statistical analysis program called "Statistical Package for the Social Sciences" (SPSS), version 23. As 0.980 and 0.987 is greater than the Alpha of 0.80, the instrument is very reliable, because there is no redundancy of indicators in the measurement of the five dimensions (components) of the variables in the *Internal Control* and *Institutional Management* research.

### Discussion of results

It is concluded from the results of the analysis of quantitative data for the measurement of the variables *Internal Control* (independent) and *Institutional Management* (dependent), that they do answer the questions and confirm the specific objectives of the UJAT research process in terms of the fact that: 1) the five components and their seventeen principles of the COSO model were identified and are present 2013, 2) if they are in operation with an average general perception with a value of 3.50, by the respondents, 3) if they work in an integrated way with a positive correlation of 99% and 95% confidence, 4) if there are weaknesses that represent 16% and 19% and strengths of 36% and 9% in the components of *Internal Control* of the total of 295 and 134 indicators, which represent 63% and 35% of deficiencies and 65% and 37% of strengths in relation to the 75 and 74 questions of the questionnaires applied in the surveys and 5) the *Internal Control* has contributed with an average general perception with a value of 3.50, to the achievement of the operational objectives, information and compliance in the *Institutional Management* of the research process.

The general question is answered and the general objective is fulfilled by confirming and accepting the hypothesis that the "*Internal Control System is effective in the Institutional Management of the UJAT Research process*", with a level of significance of 0.01 and 0.05. and confidences of 99% and 95%, with an average general perception with a value of 3.50 in the achievement of the operational objectives, information and compliance.

### Conclusions

As a result of the evaluation carried out on the effectiveness of *Internal Control* in the *Institutional Management of the substantive activities of the UJAT research process*, based on the *COSO 2013 model*, the following is concluded:

- The senior management of the University demonstrates that the *Internal Control in the Institutional Management of the process of the activities of the substantive research function* "Yes it is effective", because if the five components are identified, present and function in a linked way with their seventeen relevant principles and contributes favorably to the achievement of the operational objectives, information and compliance with areas of opportunity to improve and strengthen based on the weaknesses determined by 16% and 19% of the total indicators used.
- The relevant components and principles based on the result of the SWOT analysis show greater weaknesses (63%) according to the perception of the investigated professors and greater strengths (65%) based on the perception of the administrative staff. Weaknesses that are not considered serious, because they are generated in some cases by the lack of knowledge of research professors on the subject of *Internal Control* and the decrease in financial resources that have been allocated in recent years to research programs, due to the reduction of financial resources to the budget of the University by the federal and state governments that has an unfavorable impact on the mood and perception of the students. Surveyed.

### Recommendations

It is recommended that the senior management of the Universidad Juárez Autónoma de Tabasco strengthen its *Internal Control System* through the following proposals:

#### 1. Control environment

- **Integrity and ethical values.** Deliver the Code of Ethics to the authorities, academic and administrative staff, signing their commitment to comply in the development of their functions with periodic training and

evaluations. Socialize the policies of ethics, integrity, behavior, principles and values among the members of the university community, through the physical and electronic means of information and communication and raise awareness among students of their compliance through the academic staff. Integrate compliance with these policies into the agreements and contracts entered into with other entities and suppliers. Establish an ethics and integrity committee to settle matters of non-compliance with these policies. Implement means of anonymous complaints to acts contrary to ethical values by members of the university community.

- **Supervisory responsibility.** To establish ethics and integrity committees, as contributing areas of the University Council. Implement the Integrated Framework of Internal Control (MICI), in the processes of the substantive and adjective functions of the twelve academic divisions that make up the organizational structure of the University, in order to comply with this constitutional obligation and responsibility, which contributes to the evaluation of the effectiveness of the *Internal Control System* and contributes to achieving operational, information, and compliance objectives. Submit annually to the University Council: a) the report on the effectiveness of the *Internal Control System* in the *Institutional Management of the objectives of operation, information and compliance*, prepared by the *Internal Control Committee*, the *Office of the Comptroller General* and by the external auditors (because only the number of processes evaluated are reported without giving an opinion on whether the *Internal Control System* is effective), b) the relevant risk assessment plan, c) the relevant annual control plans of the *Institutional Management* activities of the processes of the substantive and adjective functions, as responses to the relevant risks assessed, and d) the plans for the remediation of the deficiencies observed and determined by the internal audits, external audit bodies and the external auditors; previously supervised by the committees corresponding to these issues. To regulate compliance with these proposals and submit their approval to the University Council.
- **Structure, levels of authority and responsibility.** Prepare the manual for the description of administrative staff positions, specifying the positions in the organizational structure of the University, the name of the position, unit of assignment, category, profile required to occupy the position and the description of routine and non-routine functions. Manual that must be aligned with the General Organization Manual of the UJAT. Strengthen the process of skills at management levels through periodic training. Establish promotion and training programs to assign the authorities and responsibilities of the middle management and management levels of the adjective functions.
- **Responsibility for the achievement of objectives and accountability.** Include in the evaluation programs the performance of administrative staff (management levels, middle management, operational staff) and teachers, issues related to the fulfillment of objectives and goals, risk management, *Internal Controls*, information and communication, supervision, legislation and institutional regulations and accountability, which contribute to the achievement of the mission and vision proposed in the institutional development plans and divisional, to reduce the deficiencies of *Internal Control*.
- **Commitment to the competence of its professionals.** Prepare procedure manuals that establish the criteria for the hiring of administrative staff. Strengthen formal and periodic training programs for administrative and teaching staff to update and strengthen their skills, knowledge, and strategies that promote the development and competencies of their activities and contribute to the achievement of the objectives and goals set forth in the institutional and divisional development plans. Include in these programs topics related to ethics, integrity, behavior, principles, values, and the topics suggested above, which contribute to a healthy culture of compliance with these policies in the development of their functions.
- 2. **Risk assessment.** Carry out the Risk Management and Mitigation Plans and the Control Activities Plan in the twelve academic divisions, to detect, prevent, eliminate and mitigate risks, and update them in all areas of the organization in accordance with the demands of changing environments and be supervised by the Risk Management Committees, *Internal Control Committee* and the Office of the Comptroller General of the University.
- 3. **Control activities.** Update the Manual of Budgetary Standards for the Administration of the University in accordance with the results of the identification, analysis and evaluation of risks, the Risk Management and Mitigation Plan and the Control Activities. Train research professors in the field of *Internal Control* and its updates.
- 4. **Information and communication.** Establish communication channels to receive anonymous complaints of non-compliance with *Internal Controls policies*, which affect the achievement of operational, information, and regulatory compliance objectives.
- 5. **Supervisory activities.** Carry out internal audits of the *implemented Internal Control System*, in the planning, execution and information activities of the *Institutional Management* of the substantive and adjective processes of the research projects, to evaluate their effectiveness in achieving the objectives of operation, information and regulatory compliance, which contribute to detecting, eliminating, preventing and mitigating the risks that could affect compliance with the goals and objectives to reduce their impacts. Internal audits that will contribute to strengthening, updating and adapting the *Internal Control System* and the Risk Mitigation Plan, to respond to the risks detected that contribute to the achievement of the objectives and goals of operation, information and regulatory compliance of the substantive and adjective activities established in the Institutional Development Plans and the Academic Divisions.

These results constitute a precedent for new research that should aim to review and evaluate the degree of compliance and progress in the regulation, adoption and adaptation of the Integrated Framework of Internal Control (MICI), to strengthen, improve and evaluate the effectiveness of *Internal Control Systems* in *Institutional Management* of its strategic objectives of operation of the substantive functions (teaching, research, dissemination of culture, educational extension, and linkage) and adjectives (administration), information and compliance with its legal obligations that regulate them. It is the obligation and responsibility of the senior management of HEIs to generate a culture of *Internal Control* under the MICI, which contributes to the effectiveness of educational *Institutional Management*. To this end, future research is proposed:

- The MICI and its effectiveness in the *Institutional Management* of HEIs.
- Institutional management of the risks of the substantive and adjective activities of the HEIs.
- Evaluation and supervision of the control and supervision activities of the substantive and adjective processes of the HEIs.

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