ORGANIZATIONAL CHANGE IN AN ACADEMIC UNIT OF A MEXICAN STATE UNIVERSITY: THE CASE OF THE OCEANOGRAPHIC RESEARCH INSTITUTE.

European Master in Higher Education (HEEM), a joint program provided by the University of Oslo (Norway), University of Tampere (Finland), and the University of Aveiro (Portugal)

Master's Thesis
November 2012
Supervisor: Yuzhuo Cai

María de Lourdes Ballesteros-García
ABSTRACT

University of Tampere School of Management

Author: BALLESTEROS GARCÍA, MARÍA DE LOURDES

Title of the thesis: Organizational change in an academic unit of a Mexican state university: the case of the Oceanographic Research Institute

Master's thesis: 68 pages, 3 appendices

Time: November 2012

Key words Organizational change, academic unit, higher education

In recent years, organizational change in higher education institutions has been studied from numerous different conceptions. Universities being organizations of particular characteristics tend to be analyzed in a very different manner than other social organizations. Therefore, the main objective within the present thesis is to define what organizational changes has an academic unit presented during a certain period of time, being the focal point of this research a suis generis academic unit the Oceanographic Research Institute from an autonomous state university in Mexico (UABC).

Also, the present study is structured and developed under the light of several studies regarding organizational change in Mexico and Latin America, as well as the Institutional Development Plans from UABC and IIO. From these documents six main dimensions were determined: Financial area, administrative area, legal framework, research projects, plans and programs and the relation to other academic entities (social organizations, enterprises and government). Furthermore, since the study focuses on all the changes observed from the origins of IIO until today, in order to clarify on the matter, periods were assigned on the basis of significant shifts that defined a new stage for both the academic unit and the university. This, to subsequently conclude and illustrate on a typology regarding organizational change through two complementing yet not necessarily contradicting perspectives proposed by Gornitzka (1999): The neo-institutional and resource dependence perspectives.

In order to display the changes observed during the course of five decades, several layers of significance were observed throughout a small-scale qualitative case study with an exploratory and descriptive purpose. The main data gathering strategy was through nine in-depth interviews with key individuals that held important strategic positions in the academic unit of study.

The relevance of this thesis remains in the fact that this kind of study has never been developed within an academic unit of UABC. Furthermore, there is an increase in the creation of Institutional Development Plans in Mexican universities with a clear strategic perspective not only at an institutional level but also in the academic units themselves. Due to this, the analysis of the organizational change in a specific set of times as presented study may be of a practical nature for other similar academic units.

The main conclusions lead to a drift from the changes during the origins of IIO that were predominantly neo-institutional in nature to a resource dependency perspective. Mainly, as a result to important sociopolitical movements in the 1970s in Mexico this gave way to governmental policies strictly oriented to quality improvements through evaluation instruments. Nevertheless, IIO has achieved to preserve and maintain an important capacity of decision making.
AKNOWLEDGEMENTS

I would like to express my gratitude to all of the people that helped me through the process of completing my thesis. Specially, I would want to thank my thesis advisor for his time and patience. Also, I am very grateful for the attention and time given by the interviewees of the present study.

I wish to give very special thank you to my parents, who have been my teachers on life and have always given me support. To Teemu for his time and valuable comments. Finally, to the HEEM Program and all the individuals involved in my experience as and Erasmus Mundus student.
# TABLE OF CONTENT

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>2</td>
</tr>
<tr>
<td>AKNOWLEDGEMENTS</td>
<td>3</td>
</tr>
<tr>
<td>TABLE OF CONTENT</td>
<td>4 - 10</td>
</tr>
<tr>
<td>FIGURES AND TABLES</td>
<td>11</td>
</tr>
<tr>
<td>ABBREVIATIONS</td>
<td>12</td>
</tr>
<tr>
<td>1 INTRODUCTION</td>
<td>13</td>
</tr>
<tr>
<td>1.1 General Background of the study</td>
<td>13</td>
</tr>
<tr>
<td>1.1.1 Overview</td>
<td>13 - 18</td>
</tr>
<tr>
<td>1.1.2 Research focus and strategy</td>
<td>18 - 20</td>
</tr>
<tr>
<td>1.1.3 Research aims and research questions</td>
<td>20 - 21</td>
</tr>
<tr>
<td>1.1.4 Motives and potential significance</td>
<td>21</td>
</tr>
<tr>
<td>2 HIGHER EDUCATION INSTITUTIONS AND ACADEMIC UNITS</td>
<td>22</td>
</tr>
<tr>
<td>2.1 Overview</td>
<td>22 - 24</td>
</tr>
<tr>
<td>Section</td>
<td>Title</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>2.2</td>
<td>The Mexican public university</td>
</tr>
<tr>
<td>2.3</td>
<td>The HEI: The Autonomous State University of Baja California</td>
</tr>
<tr>
<td>2.4</td>
<td>The Academic Unit: The Oceanographic Research Institute</td>
</tr>
<tr>
<td>3</td>
<td>THEORETICAL FRAMEWORK ORGANIZATIONAL CHANGE IN HIGHER EDUCATION INSTITUTIONS</td>
</tr>
<tr>
<td>3.1</td>
<td>Overview of organizational change in HEI</td>
</tr>
<tr>
<td>3.2</td>
<td>Resource Dependency Theory</td>
</tr>
<tr>
<td>3.3</td>
<td>Neo-Institutional Theory</td>
</tr>
<tr>
<td>3.4</td>
<td>Analytical Framework</td>
</tr>
<tr>
<td>4</td>
<td>RESEARCH METHODS AND METHODOLOGY</td>
</tr>
<tr>
<td>4.1</td>
<td>Justification of methodology and research approach</td>
</tr>
<tr>
<td>4.1</td>
<td>Outline of methods</td>
</tr>
<tr>
<td>5.1</td>
<td>The beginning of IIO (1960-1968)</td>
</tr>
<tr>
<td>Section</td>
<td>Pages</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>5.1.1 Changes in the financial area</td>
<td>53 - 54</td>
</tr>
<tr>
<td>5.1.2 Changes in the administrative area</td>
<td>54</td>
</tr>
<tr>
<td>5.1.3 Changes in the legal framework</td>
<td>55</td>
</tr>
<tr>
<td>5.1.4 Changes in regards research projects</td>
<td>55</td>
</tr>
<tr>
<td>5.1.5 Changes in study plans and programs</td>
<td>55</td>
</tr>
<tr>
<td>5.1.6 Changes in the relation to other academic entities, social organizations, enterprises and government</td>
<td>56</td>
</tr>
<tr>
<td>5.1.7 Discussion (The beginning of IIO 1969-1968)</td>
<td>56 - 57</td>
</tr>
<tr>
<td>5.2 The Nishikawa-Kinomura period (1968-1976)</td>
<td>57</td>
</tr>
<tr>
<td>5.2.1 Changes in the financial area</td>
<td>57</td>
</tr>
<tr>
<td>5.2.2 Changes in the administrative area</td>
<td>57</td>
</tr>
<tr>
<td>5.2.3 Changes in the legal framework</td>
<td>57</td>
</tr>
<tr>
<td>5.2.4 Changes in regards research projects</td>
<td>58</td>
</tr>
<tr>
<td>5.2.5 Changes in study plans and programs</td>
<td>58</td>
</tr>
</tbody>
</table>
5.2.6 Changes in the relation to other academic entities, social organizations, enterprises and government ................................................................. 58 - 59

5.2.7 Discussion (The Nishikawa-Kinomura period 1968-1976) .................... 59

5.3 The co-government (1977-1980) ............................................................... 59

5.3.1 Changes in the financial area ............................................................... 59 - 61

5.3.2 Changes in the administrative area ..................................................... 61

5.3.3 Changes in the legal framework ......................................................... 61

5.3.4 Changes in regards research projects .................................................. 61

5.3.5 Changes in study plans and programs ............................................... 62

5.3.6 Changes in the relation to other academic entities, social organizations, enterprises and government ......................................................... 62

5.3.7 Discussion (The co-government 1977-1980) ....................................... 62 - 63

5.4 Institutional organization (1981-1993) .................................................... 63

5.4.1 Changes in the financial area ............................................................... 63 - 64

5.4.2 Changes in the administrative area ..................................................... 64 - 65
5.4.3 Changes in the legal framework ......................................................... 65

5.4.4 Changes in regards research projects ................................................. 66

5.4.5 Changes in study plans and programs ............................................... 66

5.4.6 Changes in the relation to other academic entities, social organizations, enterprises and government ......................................................... 66

5.4.7 Discussion (Institutional organization 1981-1993) ............................ 66 - 68

5.5 Government policies for HE (1994-2001) ......................................... 68

5.5.1 Changes in the financial area ............................................................ 68

5.5.2 Changes in the administrative area .................................................... 69

5.5.3 Changes in the legal framework ....................................................... 69

5.5.4 Changes in regards research projects ................................................. 70

5.5.5 Changes in study plans and programs .............................................. 70

5.5.6 Changes in the relation to other academic entities, social organizations, enterprises and government ......................................................... 71
<table>
<thead>
<tr>
<th>Section</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.5.7 Discussion (Government policies for HE 1994-2001)</td>
<td>71 - 72</td>
</tr>
<tr>
<td>5.6 IIO adaptation to government policies (2001-2012)</td>
<td>72</td>
</tr>
<tr>
<td>5.6.1 Changes in the financial area</td>
<td>72</td>
</tr>
<tr>
<td>5.6.2 Changes in the administrative area</td>
<td>73</td>
</tr>
<tr>
<td>5.6.3 Changes in the legal framework</td>
<td>73</td>
</tr>
<tr>
<td>5.6.4 Changes in regards research projects</td>
<td>74</td>
</tr>
<tr>
<td>5.6.5 Changes in study plans and programs</td>
<td>74</td>
</tr>
<tr>
<td>5.6.6 Changes in the relation to other academic entities, social</td>
<td>74 - 75</td>
</tr>
<tr>
<td>organizations, enterprises and government</td>
<td></td>
</tr>
<tr>
<td>5.6.7 Discussion (IIO adaptation to government policies 2001-2012)</td>
<td>75 - 76</td>
</tr>
<tr>
<td>6 CONCLUSIONS</td>
<td>77</td>
</tr>
<tr>
<td>6.1 Conclusions</td>
<td>77 - 79</td>
</tr>
<tr>
<td>6.2 Limitations, further research tasks and contributions</td>
<td>79 - 81</td>
</tr>
<tr>
<td>7 REFERENCES</td>
<td>82 - 85</td>
</tr>
<tr>
<td>APPENDIX 1: INTERVIEW GUIDE ................................................................. 86 - 88</td>
<td></td>
</tr>
<tr>
<td>APPENDIX 2: INTERVIEWEES ........................................................................ 89</td>
<td></td>
</tr>
<tr>
<td>APPENDIX 3: CONSENT FORM FOR THE USE OF A NAME AND PHOTOGRAPH FROM THE INTERVIEWEE ................................................................. 90 - 99</td>
<td></td>
</tr>
</tbody>
</table>
FIGURES AND TABLES

Figure 1  Geographical location of the Baja California State in contrast with the rest of the United Mexican States. (Source: Enciclopedia Británica, 1998 & www.insidebaja.com 2004-2006)

Figure 2  IIO and FCM facilities in the UABC Ensenada Campus

Figure 3  Check from the Federal Treasury that was given to the IIO Director, then called the Research Coordinator from the Co-government

Table 1  General background of interviewees

Table 2  Predetermined categories for questions from the interview guide in relation to the two organizational change perspectives

Table 3  Dimensions of the study
# Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Expansion</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASF</td>
<td>Auditoría Superior de la Federación - Superior Federal Audit</td>
</tr>
<tr>
<td>BC</td>
<td>Baja California</td>
</tr>
<tr>
<td>CA</td>
<td>Cuerpos Académicos - Academic Bodies</td>
</tr>
<tr>
<td>CICESE</td>
<td>Center for Scientific Research and Higher Education</td>
</tr>
<tr>
<td>CIEES</td>
<td>Inter-institutional Committees for Higher Education Assessment</td>
</tr>
<tr>
<td>CONACYT</td>
<td>Consejo Nacional de Ciencia y Tecnología - National Council for Science and Technology</td>
</tr>
<tr>
<td>DES</td>
<td>Dependencias de Educación Superior - Higher Education Dependencies</td>
</tr>
<tr>
<td>EPA</td>
<td>Estatuto del Personal Académico - Academic Personnel Statute</td>
</tr>
<tr>
<td>ESCM</td>
<td>Escuela Superior de Ciencias Marinas - School of marine science</td>
</tr>
<tr>
<td>FC</td>
<td>Facultad de Ciencias - Faculty of Sciences</td>
</tr>
<tr>
<td>FCM</td>
<td>Facultad de Ciencias Marinas - Marine Science Faculty</td>
</tr>
<tr>
<td>FOMES</td>
<td>Fondo de Modernización para la Educación Superior - Higher Education</td>
</tr>
<tr>
<td>HEI</td>
<td>Higher Education Institutions</td>
</tr>
<tr>
<td>IIDE</td>
<td>Instituto de Investigación y Desarrollo Educativo - Institute of Educational Research and Development.</td>
</tr>
<tr>
<td>IIO</td>
<td>Instituto de Investigaciones Oceanológicas - Oceanographic Research</td>
</tr>
<tr>
<td>IPN</td>
<td>Instituto Politécnico Nacional – National Polytechnic Institute</td>
</tr>
<tr>
<td>PDI</td>
<td>Plan de Desarrollo Institucional - Institutional Development Plan</td>
</tr>
<tr>
<td>NSF</td>
<td>National Science Foundation</td>
</tr>
<tr>
<td>PROFEPA</td>
<td>Procuraduría Federal de Protección al Ambiente - Federal Bureau for Environmental Protection</td>
</tr>
<tr>
<td>PROMEP</td>
<td>Programa de Mejoramiento del Profesorado - Teacher Improvement Program</td>
</tr>
<tr>
<td>SAGARPA</td>
<td>Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación - Secretariat of Agriculture, Rural Development, Fishery and Food</td>
</tr>
<tr>
<td>SCRIPPS</td>
<td>SCRIPPS Oceanographic Institution from the University of California in La Joya</td>
</tr>
<tr>
<td>SDSU</td>
<td>San Diego State University</td>
</tr>
<tr>
<td>SEMARNAT</td>
<td>Comisión de la Secretaría del Medio Ambiente y Recursos Naturales - Secretariat of Environmental and natural Resources Commission -</td>
</tr>
<tr>
<td>SEP</td>
<td>Secretaría de Educación Pública - Secretariat of Public Education</td>
</tr>
<tr>
<td>SES</td>
<td>Subsecretaría de Educación Superior - Sub Secretariat of Higher Education</td>
</tr>
<tr>
<td>SIN</td>
<td>Sistema Nacional de Investigadores - Researchers National System</td>
</tr>
<tr>
<td>UABC</td>
<td>Universidad Autónoma de Baja California - Autonomous State University of Baja California</td>
</tr>
<tr>
<td>UNAM</td>
<td>Universidad Nacional Autónoma de México - National Autonomous University of Mexico</td>
</tr>
</tbody>
</table>
1 INTRODUCTION

1.1 General Background of the study

1.1.1 Overview

Organizational change in higher education institutions

Change has always been a central part of higher education institutions, as society changes the core institutions that are connected to that society must also change, preferably according to the needs and expectations of that environment. Nevertheless, these institutions may change as a response to that particular environment or they may also determine by themselves which changes they decide are relevant.

Therefore, amongst other institutions that are analyzed in regards organizational change, such as private enterprises or government, HEI (Higher Education Institutions) have become of key interest and it has also increased the relevance of the university in today's society. Even so, as Winston (2003) states "higher education is a unique industry and needs to conscious about its distinctiveness as it engages organizational change" in other words: universities have the need to create their own organizational change schemes and concepts while taking into account their particular set of values, structure and other very specific qualities.

Also, the new role of HEI goes beyond the traditional missions of teaching, research and service to the community, the university is now expected to provide the intellectual capacity necessary to build and sustain regional, national and international needs. In other words, many times they are found responsible for the prosperity and well-being of society.

In order for HEI to properly respond as key players, many transformations and changes overcome the universities and its parts. Researchers, in their pursuit of knowledge creation in regards organizational change schemes that are adequate for HEI have defined changes through several different approaches in regards organizational change. These studies range from a context-environmental focus to a more internal analysis or from a national level policy making to an
institutional level one. Even so, there are only a few of these studies pursued in Mexico, and none of them have analyzed in specific parts of the university, only on an institutional level.

Since change is an adaptation process that may be analyzed from different perspectives, areas and organizational theories. The typical areas of interest found in Mexican and Latin American studies in relation to organizational change are in the areas of: government policy, socio-political pressures, international tendencies, quality assessment, legal and economic shifts, budgeting and finance, as well as the expected teaching, research and service to the community.

As an example, comparative studies have been carried out concerning internal organizational changes that have been prompted by external agents (mainly by government) and have been named as endogenous and exogenous. The studies have been completed in two of the most important universities in Mexico, the National Autonomous University of Mexico (UNAM) and the National Polytechnic Institute (IPN). This analysis contemplates changes in the academic, management, financial and legal areas (Huerta-Cuervo, 2011). Additionally, there is an analysis concerning the institutional and neo-institutional changes in the Ciudad Guzman Technological Institute which focuses on the economic, political and administrative aspects as well as their inter-institutional relations (Vargas-Hernández, 2008).

Likewise, organizational change has been analyzed in the University of Guadalajara, a very ancient university in Mexico founded in 1591 by Jesuits (as the Santo Tomas Institute), which today is a public state university. It is also one of the HEI in Mexico to be characterized by their efforts to maintain autonomy. The organizational changes analyzed by Oliver-Villalobos (2005) in this university have been through several areas related to financial resources, management, faculty members, study plans and programs, as well as academic quality and the levels of interdisciplinary research.

Also numerous studies describe and analyze HEI organizational changes from the financial area, administrative area, legal framework and academic quality amongst other characteristics (Serna, 2005).

The only study regarding organizational change in UABC was developed by Mungaray (2004), in which he proposes a set of changes focused in the adaptations of the university in its institutional level to its global reality. Actually, this changes were implemented during his period as UABC Rector (2002-2006) and were mainly concentrated in administrative areas, the changes include administrative decentralization throughout the creation of three campuses with administrative
autonomy, a Vice-Rector is assigned for each campus, University Centers are created in smaller cities of Baja California, with the objective of satisfying the education needs of remote areas.

On the other hand, he also achieved changes related to academic aspects such as the creation of academies of knowledge areas or specialization which are research-teacher academic bodies from all the university that gathered to participate in the creation of the Development Plan implemented during his position in the Rectory. His global approaches address issues such as information technologies, regionalization and international tendencies with a focus in science and technology.

Nevertheless, Mungaray does not observe important aspects such as endogenous and exogenous changes generated throughout the existence of UABC, also there is no mention of any academic unit in particular. While on the other hand, within this university a distinguished academic unit exists: the Oceanographic Research Institute (IIO) which has been a pioneer institute in scientific research of different marine science areas. Another important characteristic of IIO is the manner in which it has performed as a promoter of institutional level changes, especially in all initiatives that are related to scientific research.

Additionally, also diverse theoretical perspectives are applied in organizational change, in the case of HEI Gornitzka (1999) proposed two main approaches: The neo-institutional theory and the resource dependency theory. The neo-institutionalism theory is in accordance with the changes caused by a free will which the institution may possess. This free will includes organizational, rules, requirements, understandings and taken-for-granted assumptions. Furthermore, the theory focuses on what an organizational form is and the behaviour that is considered acceptable. The neo-institutional nature of a university or an academic unit demonstrates the level of autonomy of the institution.

On the other hand, the resource dependency perspective suggests that the changes incurred in an institution are commonly caused by higher level policies and external pressures. Consequently, these institutions depend on the aforementioned factors in order to meet their resource needs. Also, organizations are seen as flexible and reactive to their environment having to fight for autonomy with the mind set of adaptation in order to gain critical resources.

Neo-institutionalism does not represent a unified body of thought (Hall y Taylor, 1996, 1999). Therefore, there are several different explanations regarding change. In the case of economic neo-institutionalism, the motor for change is represented by the learning capacity of an organization in relation with the incentives provided by the institutional framework, which resides within a
competitive environment that threatens the survival of the organization itself. Even so, that same threat that belongs to the environment may be visualized as an opportunity for change (North, 1993).

Furthermore, organizational change has been perceived as the result from an adjustment process over rules, norms and mandatory compliances (North, 1990, 1993). In regards to assessment of HEI framework as being part of a more ample change process it is normally registered within their environment or context. The changes in that environment are observed throughout a new governmental regulation that is implemented with the introduction of institutional quality supervision mechanisms. As a result, the study of change in the present thesis is also focused on the adoption of new external rules for assessment synced with the internal assessment system under the HEI context (Castillo-Alemán, 2006).

Therefore, this organizational change study in HEI was constructed under the light of several studies and the Institutional Development Plans from UABC and IIO where the main dimensions defined through them are: Financial area, administrative area, legal framework, research projects, plans and programs and the relation to other academic entities (social organizations, enterprises and government).

Also periods of time were assigned on the basis of significant changes that defined a new stage for both the academic unit and the university. This, in order to finally conclude and illustrate on which of the two approaches proposed by Gornitzka (1999) regarding organizational change (The neo-institutional and resource dependence) are observed on each period as well as the possible presence of both since these theories are two complementing yet not necessarily contradicting perspectives. Even though, it is important to clarify that the two theoretical perspectives are selected in order to have a typology of change and to observe what the change tendency is on each period. Nevertheless, an "integrated approach" as proposed by Gornitzka (1999) will not be contemplated in the study.

The Higher Education Institution: The Autonomous State University of Baja California (UABC).

The beginning of the UABC dates back to the 1950s when Baja California (BC) was admitted as a Federal State of the Mexican Republic after years of seeking acknowledgement. Before this time, BC was regarded as a mere territory of Mexico. At this time, the desire for creating a space for higher education in the new state of Baja California grew and intensified. After several years of
proposals accompanied by intense promotion of the possibilities that a state university might bring, the Organic Law of UABC was created giving birth to the institution in February 28, 1957. The first UABC premises were established in the city of Mexicali in May of 1958. In 1959 the state university opened a subdivision in the city of Tijuana while a third facility is inaugurated in Ensenada the following year. During the decade of the 1960s on, UABC developed throughout the whole state region (Figure 1).

The decade of the 1970s was rather problematic and uncertain. In contrast, the 1980s gave way to the creation of the first UABC faculties. Further along the years, the academic capacity of UABC kept increasing. By the year 2000, numerous expansion projects were started, making UABC one of the most important State Universities in Mexico.

The Academic Unit: Oceanographic Research Institute (IIO).

Through a rector decree, the first academic units in Ensenada were the Oceanographic Research Institute (IIO) and the School of Marine Science (latter on known as the Faculty of Marine Science - Facultad de Ciencias Marinas FCM), signed on the 15th of December 1960. Both academic units have had a close relationship since they were founded although IIO was primarily dedicated to oceanographic scientific research whereas FCM focused on education in bachelor and graduate level studies. In 1986, the first master level program was created and five years later in 1991 the first doctorate program was initiated in Coastal Oceanography. Because of this, the faculty members
from both academic units were integrated for the curricular courses of the programs, the research projects for field practice and the required thesis work.

Currently, the two units share several graduate programs with a faculty staff of over 120 teacher-researchers. Out of these academics, 64% have a PhD level degree, 25% a Master of Science level degree and 11% a Bachelor level degree. The researchers with Bachelor degrees act as laboratory technicians and field work assistants.

Amongst the main objectives of the IIO is the development of highly trained human resources. This work force identifies and evaluates any phenomenon and process from the ocean in order to generate solutions and preventive measures to problems and impacts. The additional purpose of this unit is to offer alternatives for a rational exploitation of existing marine resources while being committed to a sustainable development through a high quality modern educational process. Also collaborating and communicating with different sectors of society to diffuse the outcomes of teaching and learning for the benefit of the state of Baja California and the Mexican society.

Therefore, this organizational change analysis was constructed under the light of several studies and the Institutional Development Plans from UABC and IIO where the main dimensions defined through them are: Financial area, administrative area, legal framework, research projects, plans and programs and the relation to other academic entities (social organizations, enterprises and government). Also periods of time were assigned on the basis of significant changes that defined a new stage for both the academic unit and the university. This, in order to finally conclude and illustrate on which of the two approaches proposed by Gornitzka (1999) regarding organizational change (The neo-institutional and resource dependence) are observed on each period as well as the possible presence of both since these theories are two complementing yet not necessarily contradicting perspectives.

1.1.2 Research focus and strategy

As most organizations, Higher Education Institutions (HEI) undergo organizational change due to the fundamental importance of that change towards their own development. When in other cases organizational change is completed because of environmental demands and expectations. Examples of such are the legal requirements or socio-political accountability issues of specific regions in Mexico (Contreras-Loera, 2010).
Changes might also come as new forms of management or as internal legislation. On the other hand, these changes might be more related to curricular contents or to the teaching-learning process of higher education programs. All of this based upon the conception of autonomy in universities. Thus, the described changes demonstrate a neo-institutional aspect.

Nevertheless, there have been other types of organizational changes in Mexican HEI, which illustrate the tendency to respond to external demands, such as a government policy change, which often at the same time, come from social-political needs. These changes have generated mandatory administrative modifications in HEI as well as a conditioning in the selection of the research subjects since several of them are prioritized over others by the government. Also, as part of the change in the legal framework of HEI is reflected in the manner in which they relate to other private and public entities. All these elements have been translated to the development of restrictions for the reception of either increased or decreased budget. Therefore, these changes may be categorized within a resource dependency perspective.

The changes that have occurred because of internal or external factors are analyzed through its process or its content. The process seeks to understand how change occurs while the content describes what is modified in a particular moment (Barnet & Carroll 1995).

This study addresses an analysis of the organizational changes that IIO has undergone since its creation. Changes detected in the main six dimensions proposed which were extracted primarily from UABC and IIO PDI. Also, these same areas were identified in other Mexican and Latin American studies. This, to subsequently define which periods have changes of a neo-institutional nature or which ones of a resource dependency approach. Also, it is possible that each dimension may present a different approach from one another during the same period of time.

Throughout its history, IIO has had several types of organizational change. For the purpose of this study, the benefits and limitations are analyzed taking into account the IIO’s processes, contents and effects, as well as the dimensions proposed through their PDI.

Therefore, the academic gap addressed in the present thesis is the absence of an endogenous and exogenous analysis on change regarding financial, administrative and legal areas, research projects, plans and programs and the relation with other government, social or private entities. Furthermore,
two important factors are reviewed in this study: Observations done throughout a period of time (five decades) while focusing on only one academic unit. It is also of special interest to concentrate on the particular case of UABC-IIIO due to the fact that the two units were conceived together, thus lived through similar experiences and deficiencies in their beginnings as a public state university.

Also, in the last years HEI in Mexico -where UABC is not an exception- there is intent to promote strategic thinking in universities, also reflected in the search of university decentralization and considering the differences between academic units. Additionally, the Institutional Development Plans are not being created on an institutional level only, but also for the academic units themselves. Due to this and in order to be able to have any kind of strategic decision making it is important to register and analyze the organizational changes that occur in defined periods of time. As a result, this thesis may be employed as a basis for the analysis of organizational change in other academic units of UABC or even other universities.

1.1.3 Research aims and research questions

When focusing on the previously stated, the aim of the study is to determine the organizational changes observed in IIO through a set of periods of time. Also, on the basis of the central axis of UABC and IIO PDI an assessment is made on whether an occurred change is of neo-institutional or resource dependency nature, or if there is the presence of both.

General research question:

What have been the organizational changes observed in IIO during the defined period of five decades?

Specific Questions:

- What different periods of time are identified within the five decades of IIOs existence?

- What organizational changes are observed during these different periods in regards the following dimensions: financial area, administrative area, legal framework, research projects, study plans and programs and in relation to other academic entities, social organizations, enterprises and government?
- Which approaches in regards to organizational change are considered to be of a resource dependency or a neo-institutional theory? and which approaches present both theories?

**1.1.4 Motives and potential significance**

Several of the State universities of central Mexico, as it is the particular case of the National Autonomous University of Mexico (UNAM), as well as universities from other states such as Michoacán and San Luis Potosí, that have a long history, portrait an interesting contrast to the northern state universities that where founded quite recent in comparison.

For this reason older universities tend to have been much more observed, analyzed and studied from a general perspective but also in regards to change and the influences they have induced during their academic existence.

Despite the vast amount of Mexican autonomous state universities, there are few studies regarding organizational change in comparison with other studies regarding HEI, and even more so, the causes and effects of change.

Also, this study is considered to be of relevance since it is focused on one of the most important academic units of this relatively new autonomous state university in Mexico. A research institute that has been found to be an example for other academic units, mainly due to practical reasons: it started at the same time the university was originated, it has a long history of long-term strategic thinking, it is one of the first academic units to develop, apply and follow up on their own PDI, it has withheld a name of their own, they achieve the expected quality levels independently of the assessment method it is put through, for these and many other particulars the IIO is an interesting unit to observe. This assumption is also based on the fact that UABC adopts this academic unit as a cornerstone for other research institutes in the university up until today.

Lastly, this type of analysis is becoming of strategic importance in Mexican universities when referring to the trend of long term management and decision making. In addition, it goes *hand in hand* with the new Institutional Development Plans that are being developed in universities and that in the last two decades it is a basic document in numerous academic units not only in UABC but throughout the country.
2 HIGHER EDUCATION INSTITUTIONS AND ACADEMIC UNITS

2.1 Overview

The first European universities collected and transmitted culture in the occidental world, culture retrieved from a Greek, Latin and Arab inheritance. The first university of Bologna raised a model which was then imitated by the University of Salamanca and the majority of the university type institutions of meridional Europe, meanwhile the University of Paris was the main influence for the northern European university structure (Alcántara-Santuario, 2009).

In Hispano-American cultures, the colonial universities, where created by the Spanish crown, and they were mainly inspired by the Salamanca scheme: Lordly and classist as the society it served. According to Tunnermann (2008) the Hispanic colonial university had as a mission statement "to attend the interests of Crown, Church the superior class of society". Even though the colonial university did not enjoy full autonomy, the ones that followed the Salamanca model, had their cloisters select their own authorities and enjoyed autonomy up to a certain degree besieged by constant interventions from the different colonial viceroys, whom sought to have control over them (Llinás, 1979; Tunnermann, 2008).

In Europe, by the end of the 18th century, Emmanuel Kant considered that the autonomy of universities was directly related to the capacity or faculties of free thinking, with a complete independence from forces other than reason. In the "Conflict of the Faculties", published in 1794, Kant outlines the notion of autonomy as the constitution of a space that has freedom for criticism based on reason.

William von Humboldt, creator of the Berlin University at the beginnings in the 19th century, which was the first university to institutionalize the link between teaching and research, where he stated that the relationship between university and state should be limited, moreover, any intervention from the state would constitute an obstacle for the functioning of universities, science and fine art academies.

However, von Humboldt highlighted that universities would always be directly related with everyday life and in accordance to the States needs, since it would always be submitted to practical
tasks as the guidance of youths through university studies. Also in contrast, von Humboldt considered that the appointment of university professors should be appointed exclusively by the State through a body of inspectors that would be "wise and reasonable" (Bonvecchio, 2000).

The German case was a singular and isolated phenomenon where the relationship between university and state had very different features than other European countries, of which autocratic and absolute monarchies worked as an impediment for the development of a spirit for the search for knowledge. However, even under the domain of autocratic monarchies and in the womb of state universities that lacked autonomy, it was still possible to observe a considerable flourishing university, thankfully because of the principle of academic freedom (Tunnermann, 2008).

The first universities in Hispano-America, created in 1551, were the Santo Domingo University (Dominican Republic), the San Marcos University (Peru) and the Pontifical University of Mexico (Mexico). These universities had a significant difference in comparison with the first European universities. These mentioned Hispano-American universities were born because of an internal dynamism and as knowledge producers, since its purpose was clearly defined: To instruct natives, the sons and daughters of Spaniards in "things related to the holy Catholic church and other subjects". It is worth mentioning, that the first universities in Latin America and the Caribbean were founded during the "golden" period of the Spanish empire (Llinás, 1979; Pallán, 2004).

According to Schugurensky (1999) and Tunnermann (2008), the 1918 University Reform from Cordoba (Argentina) marks a historical moment in which Latin America enters the 20th Century and with it the advancement of the urban middle class. The reform declared new approaches on how universities should relate to State and society.

Since the creation of the colonial universities, and while going through a century where most of these regions gained independence the university purpose was to serve the dominant social class. All this, before the stirrings during the student movement in Cordoba.

Another aspect is that according to Tunnermann (2008): "If the Republic tried to separate university from the church, through the adoption of a Napoleonic scheme that, also conditioned it to the state needs, Cordoba tried to separate it from the control of the state through an autonomy regime".
The autonomy issues raised by the reformist movement of Cordoba had a wide range of demands:

- Recognition for the university members to freely choose their own authorities.
- Academic and research freedom.
- Selection of professors through pure academic procedures that would guarantee the assignment of a suitable individual.
- Leadership and governance of the University by its own managerial bodies.
- Approval of plans and study programs.
- Development and approval of budgets.
- Inviolability of the university spaces.

### 2.2 The Mexican public university

During the 19th Century the political situation in Mexico underwent several periods of instability and convulsion that were reflected in the before-known Royal and Pontifical University of Mexico. It was not until 1881, through a publication regarding the creation of the National University, that a clear conception of what higher education was finally displayed. However, this only came to be a reality 29 years later, and further on, in 1910, a law was issued which granted full autonomy to the National Autonomous University of Mexico (UNAM) (Rangel Guerra, 1983).

Levy (1987) gives a functional definition of university autonomy, emphasizing control as a key of institutional self-government while taking into account the following components:

- Labor: recruitment, promotion and dismissal of professors; selection and dismissal of directors, rectors and other administrative personnel; terms in employment contracts.
- Academic: Access (and admission) to higher education; degree selection, course offers and study plans, authorization and requirements for granting of diplomas and certifications; academic freedom.
- Economic: determining who pays; budget and funds; criteria for the use of budget and funds; preparation and distribution of the budget; accounting activities.

According to Levy, the issue at hand is not a matter of *What study plans?* or *How much funds?*, it is much more related to: *Who decides* which ones they are. In the degree in which the university...
decides over these matters by itself, the more autonomous it becomes. Likewise in the degree in which external agents decide, the university is less autonomous.

During a long period of time that contemplates half of the 20th century, the Mexican public universities enjoyed an ample degree of autonomy. However, in the decade of the 1980s, several assessment programs were introduced into HEI, regarding performance as an institution but also an individual level (academic personnel and students). Furthermore, several efficiency and effectiveness oriented programs and requirements were being implemented for all types of public service entities, in what would be known as an era of accountability. This happened within a context of financial restrictions for the social sector, integrated by the health care, education and housing institutions, to name a few. During the 1990s these programs and policies were going through an adaptation process and were polished. Up until today the aforementioned actions are the instruments that have made possible to adequately lead the academic activities of HEI according to governmental plans (Alcántara-Santuario, 2009).

In addition, at the end of the 1980s, programs for assessment and accreditation were further implemented, through academic pairs, that covered not only HEI themselves but also academic programs, focused on research in the same manner than in teaching as well as external evaluations from students. Such programs have been under a constant change, while deepening and perfecting them, until present times.

In Mexico and Latin America, from the 1980s university autonomy had begun to experiment important conditionings derived from policies regarding the matter. In a very large number of HEI, the assessment policies have established new rules that weakened institutions when altering their norms and legal mechanisms that regulated the academic conduct of all the university’s actors (Suárez & Muñoz, 2004).

In addition, from 1984 on there were differentiated salaries, instrumented by programs for academic performance improvement from SEP. Part of this is the Researchers National System (SNI Sistema Nacional de Investigadores) which offers a bonus for researchers who comply to a series of quality-oriented conditions and who are established by SNI. All of this induced by a destiny of "double loyalties" that also disrupts the traditional regime of Autonomy (Pallán, 2004). Another established format from Mexico’s National Council for Science and Technology (CONACYT Consejo Nacional de Ciencia y Tecnología) was to generate national and international
relations through what was denominated as Academic Networks created in 2009 by from CONACYT, by alternating groups of academics and researchers from different HEI in the country and from around the world.

Also, another matter of importance is the accountability issues that have been generated, that goes in contrast with the classic conception of autonomy that assumes a complete discretional use of resources. For many years, the rules assigned for budgeting were set from internal instances and since these budget-management rules were not expected to be reviewed or rated, the local, regional or federal government were never informed, neither any other type of surveillance or control instances from the legislation arena.

However, as Pallán (2004) explains several articles regarding the forms of surveillance and control of federal and state budgets where modified in the Mexican Constitution in 1999. Because of these changes, at the end of the year 2000, the Federal Congress approved the creation of a new scheme for supervision of financial resources, giving way to the Superior Federal Audit (Auditoría Superior de la Federación ASF). The law emanated from the ASF "included in a generic manner the autonomous universities as subjects for supervision, and therefore, susceptible to be submitted to auditing procedures that would permit them to know the exact use of economic resources used for the HEI plans and programs and the degree of fulfilment from each of them". The same scheme was applied to different states, which formulated and created similar legislative organizations (Pallán, 2004).

2.3 The HEI: The Autonomous State University of Baja California

As mentioned in the introduction UABC is a relatively new university, since it was founded in 1957. Its first rector, Santos Silva Cota, with support of other of the university´s pioneers established in the first Organic Law the intention of creating a School of Marine Science, with the idea of being true pioneers in Latin America, with the development of researchers in a great area of opportunity in Mexico.

Based on the fact that the country has a marine economic zone of: 2 715 012 km², which surpasses the size of the national territory itself, and that in addition needed to be managed in a sustainable manner. Furthermore from the 32 states that form the Mexican Republic, 17 have access to the ocean and they represent 56% of the national territory. In those states, 156 municipalities have
coastal fronts and constitutes an approximated of 21% of the continental surface of the country. The insular surface is of 5,127 km² (INEGI, 2009). The length of the countries coastal area on the Pacific Ocean and Gulf of California, without taking into account islands, is of 11,122 km, 7,828 km and 3,294 km from the Gulf of Mexico and the Caribbean Sea, which all complete a set of temperate and tropical waters with an immense potential.

Before the IIO marine schools did exist in HEI of Mexico, nevertheless they were only related to marine biology specifically. However, none of them had a program that would link together the four main areas of oceanography: Biology, geology, chemistry and physics. Due to the mentioned lack of complete oceanographic schools, UABC pioneers conceived from its beginnings, the creation of a strong area in teaching and research related to a general but complete study of the ocean (Oceanology).

UABC was created and organized, as all Mexican public universities up until that moment, with a structure of academic units, being the first ones the School of Pedagogy in Mexicali (capital of the Baja California State), the School of Economics in Tijuana (city bordering with the USA.) and the Oceanographic Research Institute and the School of Marine Science in Ensenada (coastal city that already had a deep-sea port).

The first years of UABC required a large amount of effort for the acquisition of resources, from infrastructure to simple employee salary budgets. Its activities started in all three cities with borrowed facilities. As for the Ensenada and the IIO-FCM case, they had a storage building donated by the Rotary Club.

From 1960 to 1969 the first steps of progress for UABC as an institution were made. In January 1961 a rector meeting was held in Mexico City, to discuss the problems caused by the limited budgets. The issues were as a result from the states for being the only source of subsidies for State universities, while at the same time UABC received a visit of the then-president of Mexico: Adolfo López Mateos, who promoted the first federal budgets for state universities. Therefore, allowing UABC to grow in infrastructure and creation of new academic units in the three main state cities. In 1969, UABC gained a donation of land with ocean front, for the construction of the facilities for the IIO and the FCM in Ensenada, facilities that still exist up until today (Figure 2).
In the period from 1970 to 1979, many important changes took place. In 1971, the State government donates land to UABC for the academic units that functioned in rented facilities in Mexicali and Tijuana. Between 1971 and 1974 new schools were created throughout the state and, in the particular case of Ensenada, the School of Biology Sciences was created, which latter added other disciplines such as Mathematics and Physics, to latter become what is today, the Faculty of Sciences (Facultad de Ciencias FC) whom from its beginnings shared land next to IIO and FCM. In 1974, the first scientific review of UABC is published and arbitrated, it was named CIENCIAS MARINAS, giving a strategic importance to IIO and the university as a whole, since it was and still is renown at a national and international level for the quality in its publications.

From 1975 on, the reform to the Law of Income is issued and applied, which increased the State’s tax over education from 10 to 15%. Meanwhile, the federal government also increased its subsidiary contribution, which gave continuous growth to the university in terms of infrastructure, equipment, materials, number of professors and other academic areas. By then, the labor force had already been organized through a labor union. On March 3rd 1975, a labor paralysis took place in almost all the Schools of UABC, and in some of them, a co-government was established, where all the decisions were taken in general assembly with the participation of professors, researchers, students and administrative employees. The co-government was present particularly in the academic units of Social and Political Science in Mexicali, the Economics School and Chemistry Sciences in Tijuana and in the IIO and FCM in Ensenada. This was a period of high political instability, not only in Baja California, but also in the rest of the country, generated mainly by student movements that
happened in Mexico City between the years of 1968 to 1972. In the specific case of Ensenada, the IIO and FCM were constituted, during this co-government period (1975-1980), in what was called the Marine Science Unit, the General Coordinator was the Dean of the FCM, the Research Coordinator was the Director of IIO and the Teaching Coordinator was the Sub-Director from the FCM.

The period from 1978 until 1980, was a complicated one, many manifestations and protest movements were taking place, where the democratic and political structure of UABC was put to the test. This also unleashed a general strike from teachers and student leaders from October 1980 until January 1981, as a result a great movement that lead to the expulsion of professors and students, there were also changes in deans and directors of several academic units, amongst them there was IIO and FCM.

From 1980 to 1989, the organizational changes observed were of high impact within the university. With the creation of statuary bases, through the UABC General Statute, that came to govern over all the academic units (Schools, Faculties and Institutes), also the formation of Technical Councils, to name a few. In the same manner the Academic Personnel Statute was created, with the objective of separating the right of the university to select its teachers and researchers academically with a position contest, from all the other labor guarantees which were already stated in the Collective Workers Contract (from the professors syndicate). Furthermore, the Rectory and the UABC General Directors were created as administrative entities, amongst them were the Organization, Programming and Budgeting Direction, which generated the function and operations manual and also established a scheme for the creation of budgeting "based on preconceived program" for each Academic Unit in UABC. Moreover, they also generated a complete administrative reorganization of UABC. In 1983, the Planning and Institutional Development Commission was created, that would latter on become the Institutional Planning Direction. Also, the three main University units were clearly defined: Mexicali, Tijuana and Ensenada, with a smaller unit in Tecate.

During this period the academic units and general infrastructure was in full growth all over the state. In 1985, the FCM had its first post graduate degree program: the Master Degree on Biologic Oceanography, the same one that was supported by the IIO. Additionally in 1990, between both academic units the first Ph. D. program in all of UABC was created: Doctorate on Coastal Oceanography. Later on, the Ph.D. in Environmental Development was lead by IIO with the support of FCM and Science Faculty.
From 1991 to 1999, a great growth period is registered, not only on infrastructure, accessibility for students and teaching-research opportunities, but in addition the postgraduate levels offered in several academic units as well the national recognition of the Medicine Faculty and its programs from Mexicali and Tijuana, in the same manner as the Faculty of Architecture in Mexicali. The Institute of Educational Research and Development (IIDE) in Ensenada, that has also been recognized at a national and international level in what refers to research of education as well as their electronic journal REDIE.

From the year 2000 on, UABC has been consolidating as one of the best ranked autonomous state universities in Mexico, alongside with the Autonomous Universities from Nuevo León and Aguascalientes. In 2002, Alejandro Mungaray Lagarda is assigned for the UABC Rectory, where he promotes the reform of UABC’s General Statute were he defines three main campuses: Mexicali, Tijuana and Ensenada, and assigned each of them the figure of a Vice-Chancellor (or Vice-Rector) as a administrative authority in each campus with a more independent management capacity.

Another important change is seen in the academic units. Where the director (or head of the academic unit) has as its only hierarchical authority the Rector, while still having limitations in what referred to administration and decision making, since they had to "deal" with the General Directions from the central management (in Mexicali) mentioned previously, that more than the administrative support they were expected to be, they have become power entities, therefore the General Statute reform also contemplated to convert them into General Co-ordinations with a more clear definition of their function as an administrative support for the academic unit Directors throughout UABC. In this period university campus extensions were introduced to smaller cities., Such was the case for San Felipe from the Mexicali campus, Tecate from the Tijuana Campus and San Quintin from the Ensenada Campus.

According to the Mexican Sub Secretariat of Higher Education (SES Subsecretaría de Educación Superior) from Secretariat of Higher Education (SEP Secretaría de Educación Pública), UABC is ranked within the first five public state universities in Mexico. Furthermore, this position is withheld due to the quality and excellence existing in many of the academic units in UABC where, as sated before, IIO has held an importance place in what is avant-garde oceanographic teaching and research in Mexico.
2.4 The Academic Unit: The Oceanographic Research Institute.

As stated by Bolton (2000) the importance of analyzing academic units as a part of a larger institution relies on the "pressing need for change". He also states how "taking snapshots of prevailing reality is of limited value" since the university’s environments is, as most environments are: living within continuous change. Furthermore, the "managers" of these academic units have to possess a particular set of skills since they are dealing with also a very particular group of people who are highly intelligent and are motivated by intrinsic attractions of their work more than bonuses or short term attractions.

When referring to changes imposed on academic units, we may refer not only to institutional changes or government actions, but also those imposed by other types of interest groups such as employers, external clients, local or state authorities, professional associations and other type of associations that might cause pressure towards change. The academic units as a part of a HEI have to "capitalize upon the environment" and have the capacity to strategize on any forthcoming change, as well as to know when the changes are induced by internal needs (Bolton, 2000).

UABC has always functioned under a scheme of academic units in the form of schools, faculties and institutes. The General Statute, generated in the beginning of the 1980s, governs all the features of an academic unit functioning, as well as their management capacity, their freedoms and scopes. In the same manner the Statute establishes the features that a head of academic unit or Director should possess as the main authority of the unit, also as their role in the Technical Research Council in matters related to the appointment of Directors and the connection with any superior authority of UABC as it is the main UABC Governance Council (where members consist of ex-rectors from UABC) or the University Council (consisting of directors, students, researchers and teachers).

As mentioned before, the first academic units in Ensenada were the IIO and FC. Being a pioneer institution, IIO started out in a much diffused manner and in several moments quite uncertain of its future, also since it was the first school of its kind in all of Latin America. Furthermore, the IIO was created as a possibility to have an experimental area for teachers that were being prepared in this focus for the first time in Mexico. Since its inception, the IIO’s activities were renown in a national and international scale. This was also driven by the great distance between Baja California and Central Mexico, where the majority of knowledge production, regarding marine science (and mainly marine biology), was generated. When on the other hand, the proximity of California, USA
and particularly its institutions as it was the case of SCRIPPS Oceanographic Institution from the University of California in La Joya (SCRIPPS), as well as the San Diego State University (SDSU) with its geology department, same that where the "adoptive parents" of this new project. This was mainly due to the personal contacts and relations of the first IIO directors, such was the case of César Obregón M-Sanz in IIO and Pedro Mercado Sánchez in FCM, these relations where revealed when analyzing the support given for the design of plans and programs of the Bachelors Degree in Oceanography in the FCM or in the first research projects financed by the National Science Foundation (NSF) in the USA for the creation of a Geological Mapping of the State of Baja California which was not yet done at the time, done with the aid of researchers and students from IIO and FCM.

These scientific projects where presented, by the first IIO Director, César Obregón in New York, as part of joint research projects developed with the before mentioned. It was not until the I National Oceanographic Congress that took place in the State of Guerrero in southeast Mexico that the research conducted in IIO regarding geological oceanography was known to a national scale.

In 1968, the Director assigned to IIO who was a member of the first generation to graduate as Oceanographers from the FCM, the Mexican-born Katsuo Nishikawa-Kinomura of Japanese parents. It may be stated that during this time the differences between the institute (IIO) and the school (FCM) are clearly defined as IIO is also established in different facilities than FCM. Another change the IIO experiences during the period of this director and his collaborators, is that most of the FCM graduates, some of them with postgraduate degrees from abroad, developed two large research projects related to the study of the environmental scheme of two highly important regions in the State: San Quintin Bay and the High Gulf of California. With these two well structured projects, Nishikawa-Kinomura approached the Secretariat of Hydraulic Resources (Secretaría de Recursos Hidráulicos) in Mexico City, to request the financial resources needed for the projects. Many of the bachelor degree students, for a several generations, collaborated with these projects in order to also work on their thesis within this particular research area.

In 1973, Nishikawa-Kinomura, alongside Saúl Álvarez-Borrego, another leader in the oceanographic arena within Mexico and also a graduate from FCM (with the degree of Ph.D. level in Chemical Oceanography form the Oregon State University in the USA), promote the creation of CIENCIAS MARINAS, the first arbitrated scientific review of all UABC, which was edited in IIO, and continues to do so, with great international recognition.
After this period, times of high political instability take over all of UABC. Marked by the newly created co-government (1975-1980) which gave way to what became known as the Marine Science Unit that intended to join the IIO and the FCM. During this period, Álvarez-Borrego and his collaborators, many of whom were part of the projects mentioned before as well as other new ones that were generated during this period, excelled in many scientific reviews, publications and symposiums in Mexico and around the world.

During this co-government period, land and resources were obtained to extend the existing IIO facilities as well as to invest in equipment, this can be attributed to the government of the Mexican president Luis Echeverría Álvarez who sympathized with these new forms of organization (co-government) in public universities and which he supported these universities. Furthermore, large amounts of students that were interested in studying science-oriented programs, due to this the FCM received a large amount of students, not only from other states in the Mexican Republic, but also from other countries of Central and South America. Nevertheless, because of the co-government also came looseness over academic control. Consequently, this new form of organization came to an end, mainly through a movement and intervention from the state and federal governments, because of this, on January 1981 the co-government is officially dissolved and the IIO and FCM where again regarded and organized as separate and independent academic units.

From 1981 on and during most of the 1980s, there was a period of legislation and internal organization in UABC as a whole, which is defined throughout the General Statute, and in the particular activities of the academic units. The IIO participated in an especially important manner, as an institutional advisor for the development of regulations for all the Research Technical Councils in UABC, as well as the internal research assessment organs, all of this within an environment of institutional autonomy.

The first postgraduate programs in the FCM are created with the support of the IIO, also between both academic units the Ph.D. program on Coastal Oceanography is developed, which was the first Ph.D. program in all of UABC.

During these times, freedom in the research arena was observed and research projects were multiplied, due to a larger quantity of full time researchers, where the majority possessed a postgraduate degree, also this increase in faculty members was a result of the opening of these new postgraduate degrees in IIO and FCM.
Since the beginning of the 1980s, national and international legislation and government controls are set in what referred to higher education, the IIO initiates a process of change to suit this new reality, which in one way or the other, may be categorized as a necessity in order to obtain resources. Nevertheless, many of these changes were made within a high degree of freedom or with the participation and decision making of IIOs members, at a institutional - UABC level, due to the ample experience of the researchers that was truly recognized and valued by UABC. It is important to point out, that during the 1980s, these legislations and controls were not yet an external requirement.

During the 1990s, the number of researchers in the SNI System had continuous growth. Being mainly due to a large number of research projects financed by national institutions, such as CONACYT and SEP, as well as international ones. The Ph.D. in Molecular Ecology and Biotechnology are developed by IIO in collaboration with the FCM and the FC, which complies with all the requirements of entry to the Patron of Excellence from CONACYT, for which the program receives economic support. Also all the students from the program, once admitted, receive a full scholarship for studies and living expenses. One factor that was highly promoted during this decade through SNI was technological development and the registry of patents, in a manner that a registered patent, depending on its importance, was equal to one or two arbitrated publications. Because of this, researchers began to register many of their projects that had technological applicability and, above all, in aquaculture and physics-oceanography related areas (what is known as oceanographic instrumentation, the development of instruments and equipment).

From the year 2000 on, human resources and infrastructure continued to increase, another facility is build to have full capacity for teacher-researcher cubicles and postgraduate classrooms, also the remodeling and conditioning of the various laboratories with budgets obtained directly from SEP. In 2005, IIO created a new Ph.D. program in Environmental Development, in coordination with the other two academic units (FCM and FC) from the Ensenada Campus. Furthermore, following governmental policies, the Academic Bodies (CA Cuerpos Académicos) are created with researchers from IIO, the FCM and FC, most of them defined as CA consolidated by the quality of its members and the research done. In the same manner the Academic Networks (Redes Temáticas de Vinculación) are defined, from a national as well as an international level. Being the researchers from IIO quite successful in developing these networks, since from many years before this type of networking was already used by IIO, due to specific past experiences, such as receiving researchers that had postgraduate degrees from foreign universities, the origins of IIO and their relation with
foreign HEI, as well as the national and international agencies they have been in contact with for sabbaticals abroad, joint research and publication.

Today, the IIO has 41 full-time researchers and 19 academic technicians (research assistants). From the total of research members and technicians, 30 are active members of the SNI System and 27 have the Teacher Improvement Program PROMEP (Programa de Mejoramiento del Profesorado) profile. It has 12 official Academic Networks which unite groups of academics and researchers. Amongst these Networks, designed by SNI, there are subjects regarding water, biotechnology applied for agriculture, bar-coding, pharmaceutical development and diagnosis methods, high energy physics, mathematical models, nanosciences and nanotechnology, information and communication technologies, science complexity and society, ecosystems, energy sources, sustainable development and environment . There are 11 Academic Bodies that are already consolidated and two in a developmental stage.

Since its creation, IIO has been regarded as a *sui generis* academic unit within UABC, since it has always been a sort of *spearhead* at an institutional level in matters related to scientific research. In addition, IIO is represented in several institutions that are related to the analysis and problem solving issues regarding the ocean and coastal areas such as the Secretariat of Environmental and Natural Resources Commission, the Secretariat of Marines, the Secretariat of Agriculture, Fishery and Rural Development, to name a few. Also the IIO has agreements of collaboration with the Federal Congress for issues related to fishery, aquaculture, climate change and oceanography.
3 THEORETICAL FRAMEWORK

3.1 Overview of organizational change HEI

The concept of change is a highly complex and dynamic one since these shifts or alterations that individuals and organizations undergo in today's knowledge society, tend to be of a rapid and volatile nature, this concept has become difficult to explain from only one perspective.

Change is contemplated from many schools of thought, which range from the external-environmental or contextual perspectives to a more internal process of organizations and, in many cases, the combination of both. Furthermore, an important fact is that change may be planned, predicted or unexpected. These different types of changes may challenge contemporary organizations, in which HEI are included.

HEI undergoes several forms of pressure, do to other organizations do, while in the search of autonomy and legitimization, boost or hinder its tendency to change. These pressure factors may be: Arrangements with its internal and external stakeholders, government policies, funding and budgeting issues, existence of highly diversified knowledge, globalization, internationalization, communication and information technologies, complexity in the internal-external environment, massification of education, regionalization, marketization, growing competition amongst HEI, just to name a few.

From an organizational management point of view, organizational change refers to “understanding alterations within organizations at the broadest level among individuals, groups, and at the collective level across the entire organization” (Burnes, 1996). In a more focused perspective of change, Clark (1983) states that it refers to "alterations that vary from simple reproduction to radical transformation". Further on Clark also explains how change has to be differentiated from the "emergence of an educational system as a major form of change and the alteration of a system once in its place" supporting the idea of the existing internal or external factors for change, and in many cases de oscillation of both.
Since change has always been a characteristic of HEI it may be stated that in the same manner that society change, the institutions connected to that society are expected to change accordingly, however, these institutions may choose to change before it is expected or required of them.

For these changes to take place in HEI, deep organizational change approaches are being contemplated in university strategic planning and policy development, not only at the institutional level but also in other levels; such is the case of academic units. To achieve a thorough analysis, diverse frameworks have been proposed to analyze this concept, mainly taken from general management schools, paradigms or theories from authors such as Henry Mintzberg, Joanne Martin or John P. Kotter (Bastedo 2012) the findings have been adapted to the HE arena, while other conceptions are a novelty or are being “re-arranged” according to the specific characteristics of the universities.

Additionally, Kezar (2012) explains that a change within an organization entails alteration of beliefs, myths and rituals (Schein, 1985) were also history plays an important part, since it enables us to understand these transformations, as they represent a collection of change processes over a certain amount of time.

When referring to the main studies conducted under the subject of organization change in Mexico Huerta-Cuervo (2011) developed a comparative study between two public universities where the main aspects analyzed were academic quality (plans and programs), the inefficiency in the use of government financial subsidies as well as the relation between autonomy and changes conceived through government. Also, Vargas-Hernandez (2008) observes current changes in Mexican HEI considering political aspects, resource management and also academic quality in order to generate a forecast for the year 2020.

Additionally, Oliver Villalobos (2005) performed another comparative study focused on researchers and teachers of Mexican HEI in connection with structural and organizational changes. She states that while these changes have prompted a growth in science and technology they have also limited the amount of financial resources and brought forth complications for academic quality substantial improvement processes (for both teaching and research).

Also, Oliver Villalobos refers to the importance of interdisciplinary research between academic units within the same university as well as the relation with different public and social entities.
Furthermore, Castillo Aleman (2006) performs an analytical comparison between HEI of different legal regimes and explains the organizational change observed in each of them as a result of external improvement assessment over research as well as in academic plans and programs.

When Mungaray (2004) analyzes organizational change in UABC he concentrates on academic and administrative changes in the university on an institutional level only. He notes the importance of performing these changes in order to adapt to a world-wide context in what concerns information technologies, globalization and regionalization and above all to international HE trends with a high emphasis on science and technology.

For the present study the analysis of organizational change is performed on the basis of six different areas defined (figure 3) and selected through a document analysis of UABC and IIO Institutional Development Plans (PDI Planes de Desarrollo Institucional). These dimensions are also found in several organizational change studies in other Mexican and Latin-American HEI. Since the particular interest of the present work is centered in a sui generis academic unit, the dimensions that were considered in those other studies and are present in UABC/IIO institutional plans are employed to analyze the unit in the light of specific areas identified as: Financial, administrative, legal, research projects, plans and programs, as well as the relation to other entities (government, enterprises and society). These dimensions will be addressed under the light of two theoretical perspectives proposed by Gornitzka (1999) who discusses and proposes two organizational change approaches applied in HEI through her study of governmental policies in relation to change in HEI: The resource dependency theory and the neo-institutional theory.
### Figure 3 Dimensions of the study

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Financial area</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study plans and programmes</td>
<td>Oliver-Villalobos, 2005</td>
<td>Policy 1. Student development.</td>
<td></td>
</tr>
<tr>
<td>Relations to other academic entities,</td>
<td>Vargas-Hernández, 2008</td>
<td>Policy 3. Expansion of presence in the community.</td>
<td>Policy 3. Relations with other entities</td>
</tr>
<tr>
<td>government</td>
<td></td>
<td></td>
<td>Policy 6. Cultural environment</td>
</tr>
<tr>
<td>Political</td>
<td>Mungaray, 2004</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faculty members</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regionalization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>International tendencies</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.2 Resource Dependency Theory

Thirty four years have passed since Pfeffer and Salancik (1978) gave sustainability to a perspective that later became one of the most important works regarding strategic management, organizational theory and one that has also been applied to many other areas of knowledge. This approach focuses on the institution’s capacity for change when taking into account their resources, as well as their need of them, while being conscious of the resources they possess that may be of use for obtaining others. In other words, organizations answer to external influences and tend to react, with the condition of the "dependency" level they have over particular resources they need.

Kriby-Harris (2003) describes this theory as an active process where the role of organizational leadership and internal political structures are key factors. He also clarifies how organizations tend to respond in an economically rational manner to external economic influences. Furthermore, Gornitzka (1999) lists to the resource dependency approach as possessing several factors that define the link between an organization's resource dependencies and its actions:

1) The potential of one organization influencing over another, depending on the resources and the access to alternative ones. “The greater the power of external stakeholders the greater the environmental determinism, whereas greater organizational power suggests greater capacity for organizational choice” (Hrebiniak & Joyce, 1985).

2) Organizations have other options than satisfying external demands; they may be capable of controlling their ‘dependencies’ in other ways.

3) Environments "are not treated as objective realities" meaning that it does not solely depend on the facts but also on the perception of the organization.

Therefore, the dependency theory denotes that the perceptions of organizations are important, as well as how they control them. Also, to a certain degree, they tend to be rather flexible and are influenced by external factors such as government policies. And very importantly, they have the need to fight for their autonomy. Lastly, it is important to take into account the already mentioned leadership and how internal power is managed.

When exploring the six dimensions mentioned beforehand Nienhuser (2008) states that regarding financial areas within the dependency theory perspective individuals that have control over critical
resources tend to have access to the upper control levels as heads of organizations, hence high levels of power. And that even if those resources may become more "critical" overtime, these heads might help deal with financial uncertainties in the organization. Additionally, several authors (Pfeffer and Salancik, 2003) explain how in universities also "structure follows resources" and not the other way around, meaning that the changes or shifts seen in HEI are based on an adaptation of their financial needs in accordance to the environment, since external budgets and funds are becoming one of the most critical resources in universities.

In the administrative areas the power heads may also influence in organizational behaviors where the management of these dependency relationships are of importance (Nienhuser, 2008). While at the same time Pfeffer and Salancik (2003) also state that "individuals assume that managers have more influence on organizational decisions that they actually have" and gives them the power to create a "feeling of prediction, control and orientation to action".

When exploring the legal framework dimension, as seen on figure 3, this particular dimension is not discussed in the present UABC or IIO Institutional Plans. Nevertheless, it is still included as an area of discussion due to the fact that it has been contemplated in past PDI (e.g. Mungaray UABC PDI 2002-2006) and also since several of the mentioned studies contemplate that the changes in government policy and law are one of the major generators for need of adaptation, transformation and change. As an example, Hillman, Withers and Collins (2009) state that organizations that are frequently affected by massive changes in the laws tend to have internal legal departments that are most probably quite powerful, as it is the case of UABC which has not only a very strong central legal department but also has a legal entity in each campus. Additionally, one of the most important periods that will be mentioned further on this study is primarily related to the creation of a legislation structure for UABC.

When observing academic quality through research and teaching plans and programs the teaching-learning objectives as well as the support for research projects are associated to the importance and resource offer for those particular academic proposals. As stated by Rueter, John and Perrin (1997) decision makers face several contingencies while defining teaching and research objectives such as access to technology, the needed resources and the assessment that will be applied. As well as stated by Oliver Villalobos (2005) even if there is a high commitment with the promotion of science and technology the reality in Mexico is that resources are still quite limited and this can be observed in the quality assessment outcomes.
In relation with the perception of other entities such as government, social sectors or private companies as resource owners or resource providers, Pfeffer and Salancik (2003) see them as external stakeholders that manage resources which they may offer to the university which makes it the resource receiver, at the same time the university may offer their resources to other organizations. It is important to add that when it comes to HEI and their relations to their stakeholders and interest groups, above all, government actions are the ones that are studied the most (Kohtamaki, 2009).

3.3 Neo-Institutional Theory

This approach, views organizations as changing according to institutional expectations -in a context of taken-for-granted norms and beliefs- with little of the active choice behavior, predicted in the resource dependency. Also, these institutions operate as units in an environment that is dominated by rules and understandings about what is regarded as appropriate or acceptable forms of behavior (Gunasekara, 1999; Kriby-Harris 2003).

The neo-institutional theory recognizes that organizations belong to a particular environment where other organizations also exist, in what may be called an institutional environment. Depending on this environment (with rules, requirements, understandings, etc.) the organization makes rational choices (Oliver, 1991).

According to Powell & DiMaggio (1991) this theory has a sociological view of organization, since there is an interest in analyzing how organizations affect society. Additionally, an organization should not only survive through economic success but also by establishing legitimacy within the institutional environment, and to heed factors related to resistance to change and leadership are to be noted.

Consequently, neo-institutionalism states that the main goal of an organization is to survive in its environment. In order to do so, Scott (1995) indicates that it should be through the existing rules and beliefs that persist in the mentioned environment.
Another important factor related to neo-institutionalism is the focus on possible barriers to change that an organization might have (March & Olsen 1989). Also, in this particular approach, institutional autonomy is one of the main characteristics.

Furthermore, when focusing on the six dimensions extracted from the PDI for this study this theory explains that to have a successful policy or plan implementation, the degree of institutionalization of these plans and policies is of great importance. In the particular case of the financial arena it is an essential task of university to avoid any preconception that would jeopardize their access to important resources needed for their survival while on their search of autonomy or when dealing with resistance to change (Alvarado-Altamirano, 2006). Also, rational decision making is important to point out in the financial and administrative arena, since the head of the organization will be the key individual for the institutionalization of any change, be it enforced from external (e.g. the market or institutional context) or by internal (e.g. values or capacity for change) constituencies.

Generally when theoretical aspects related to organizational and administrative studies are discussed in academic environments, it is usually presented that the neo-institutional perspective presents a static vision over organizational change. This follows the inclination toward the analysis of processes that are the center core of an organization's functions that give stability to its structure and functional activities (Meyer and Rowan 1999).

Suchman and Edelman (1991) contemplate that since neo-institutionalism in organizational analysis take rules and norms as core, this particular theory strengthens the concerns of contemporary law. All though, neo-institutionalism might "go a bit too far" when embracing a model that can be to authoritative and coercive in an organizational environment.

In regards academic quality, specifically referring to research projects, study plans and programs neo-institutionalists such as Meyer and Rowan (1999), contemplate three aspects for analyzing organizations. First, the superstructure which consider the main core of the institution (e.g. mission, vision, strategic objectives). Second, is the structure referring to students, teachers and researchers, as well as projects, plans and projects. Finally, the third aspect is the infrastructure meaning the material or financial services and resources.

As a final task, the neo-institutional view regarding the relationship of HEI with other entities, be it government or the private sector, Montoya-Suárez (2006) states that this process may be much more
complex if in requires substantial changes in the university functions such modification of research aims or a shift of interest groups, while at the same time, if these connections are based on everyday implementation of preconceived policies it not only does not disturb the structure but may help it conduct in a sable manner.

3.4 Analytical Framework

The intention of the present section is to clarify how the six selected dimensions (Financial area, administrative area, legal framework, research projects, study plans and programs and relations with other entities) relate to the resource dependency and neo-institutionalism theories. As it was stated in the past two sections, there are several different studies that serve as examples on how those dimensions where contemplated for analyzing organizational change under the light of these two theories.

In the financial arena, external funds and budgets are becoming more important while at the same time structural changes are done in HEI to fit the requirements for the reception of these funds. This dimension reflects the resource dependency aspect of universities being reactive to these external influences. Additionally, in the level in which universities institutionalize regulations to fit these demands, the more "rational" decisions will be made to comply with external requirements and be eligible to receive these budgets. Also, within the PDI from UABC and IIO one important aspect for the institution and academic unit is the capacity for equipment and infrastructure optimization. Moreover, in the specific case of the academic unit the accessibility to financial resources that are considered critical to research.

In what concerns all administrative affairs, the role as head (or director) of the academic unit will be of strategic importance through adequate leadership and the level of power influence over its members and external interest groups. Also the internal structure will influence this power struggle as well as the level of resistance to change. This view relies on the resource dependence perspective, whereas under the neo-institutional conception the taken for granted rules and norms are very well rooted in this particular research institute, they have been institutionalized by the autonomy gained since the origins of IIO. Furthermore, the UABC PDI states in a specific manner the necessity of the university and academic units to have regulations that meet the needs of the university, something that may reflect the level of flexibility of both UABC and IIO.
Additionally, stated before any shift in government policy or any other pressures that may result in an organizational change of the universities tend to be perceived as a threat unless there is a clear explanation of why it is being exerted. At present times, UABC as most Mexican HEI have very strong legal structures that give service to internal as well as external needs. In this particular case, of UABC-IIO the legal framework tend to respond to only major shifts that actually affect institutions nationwide, therefore, these changes are slow and take a reasonable amount of time. In which case has to be eventually legitimized by the institution itself. As a result, this area would be more related to the neo-institutional perspective than the resource dependence.

In what relates to academic quality of research projects, study plans and programs the tendency of institutions to react to external dependencies is relatively high, considering the fact that most research projects are many times bound to very specific research objectives. Even so, many researchers or research institutions have had the capacity to survive in their environment without the need of only reacting to it; an example would be the case of the IIO. When observing the universities and their relationships with other organizations or government the association with them will always have a resource dependency connotation since as they have resources that the HEI needs, the institution also provides them with requires resources.
4 RESEARCH METHODS AND METHODOLOGY

4.1 Justification of methodology and research approach

The present work has an exploratory and descriptive purpose, as suggested by Marshall and Rossman (2006). This study is regarded as exploratory since it aims to analyze several layers of significance, from an organizational change point of view that can be observed in this academic unit during a particular set of time (five decades).

When speaking of layers of significance and organizational change the study will take into account the Institutional Development Plans from UABC and IIO, where the main dimensions defined through them are: Financial area, administrative area, legal framework, research projects, plans and programs and the relation to other academic entities (social organizations, enterprises and government). Additionally, in order define a typology of change Gornitzka’s (1999) two main theoretical perspectives will be adopted the resource dependency theory and the neo-institutionalism theory in order to produce a final conclusion of significance.

Furthermore, this study attempts to reveal a descriptive perspective, since it seeks to provide a documented account of the organizational changes that have formed the academic unit into what it is today.

As the study discusses five decades of changes lived within an academic unit, in order to obtain the right type of data, the collection strategy has been undertaken as a small-scale case study. As Yin (2003) states, a case study is "used as a research strategy to contribute to the knowledge of individual, group, organizational, social, political, and related phenomena". The main data gathering strategy was through nine in-depth interviews (Table 1) with the individuals with strategic members who have been Directors in IIO, considering that being the head of the institute during a determined time contributed to obtain the necessary information (Rodríguez-Gómez & Valldeoriola-Roquet, 2009).

For the purpose of the study all the possible candidates for an interview were contacted, meaning that six from the total of nine Directors of IIO were meet and interviewed. From the other remaining Directors, two are deceased and one was unable to be located. In order to receive adequate information from this missing three key individuals, other individuals were selected for an
interview, chosen due to the notion that they were essential members of those periods within the management and head office.

To be more specific (also see Table 1) these individuals held the following positions: From 1968 to 1973 which was the period occupied by Katsuo Nishikawa-Kinomura (now deceased), his wife was interviewed based on the notion that besides being his spouse she was also a research assistant of IIO.

Also, Alfredo Chee-Barragán and César Obregón were interviewed regarding that period, since both of them were close collaborators of Nishikawa-Kinomura. In addition, Chee-Barragán was Sub-Director of IIO in numerous occasions under three different Directors: 1987-1993, 2001-2005 and 2005-2009. Chee-Barragán has also always been a researcher from the Nishikawa-Kinomura period up until present time. The third and last interviewee, Guadalupe García-Lepe was selected to recount on many of the periods while being a key member of IIO as a Researcher (1972-2009) and FCM Director (1982-1992), an academic unit that has had a close relationship with IIO since its origins and has special knowledge of the changes in IIO during the period of her FCM position. Furthermore, García-Lepe was Vice-Rector of the Ensenada Campus (2002-2006) where IIO and FCM belong.

As stated, the interviews were assigned and carried out in a manner that the changes observed during this five decades were produced in a clear manner, were the objective was to obtain the majority of information possible, of not only basic information regarding organizational change or about the specific period were the interviewees were Directors, but also to find a set of personal experiences during their time in IIO as collaborators. This based on the notion that the interviewees were not only Directors of IIO but additionally all of them, with the exception of one, were students from the FCM and IIO. They were all initiated as researchers in IIO, while also several of them have obtained their Master or PhD degree in foreign universities. When choosing to return, they would commonly occupy the position of IIO director. Moreover, several of them have been in other important positions in the central management of UABC. Lastly, but also considerably important, they all have served, and many are still serving the institution, as researches and teachers.
Table 1  General background of interviewees

<table>
<thead>
<tr>
<th>INTERVIEWEE</th>
<th>DIRECTOR IIO</th>
<th>SUB-DIRECTOR IIO</th>
<th>RESEARCHER IIO</th>
<th>PROFESSOR FCM - IIO</th>
<th>RESEARCH ASSISTANT FCM</th>
<th>STUDENT FCM</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Deceased)*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*In the place of Katsuo Nishikawa: Amelia Chávez, Cesár Obregón and Alfredo Chee were interviewed, based on their ample knowledge of his period.


***General Director of Research and Graduate Education in UABC
4.2 Outline of methods

The interviews were conducted with the assistance of an interview guide (Appendix 1) that aimed to explore the basic concepts regarding IIO and the organizational changes that have occurred in the stated period of time. The type of interview was also chosen because it allowed the interviewees to immediately clarify over any subject that needed to be pursued further with follow-up questions and also to support with additional comments or questions that were considered necessary during the interview. Following the seven stages of an interview inquiry proposed by Kvale & Brinkmann (2009), the design of the study considered the following steps: Thematizing, designing, interviewing, transcribing, analyzing, verifying and reporting.

On the first stage of thematizing, the present work has focused on gathering the right information regarding change from the six dimensions obtained from past studies and the HEI development plans, as well as the two perspectives mentioned in the theoretical framework in relation to organizational change. Also taking into account the concentration that was needed over the academic unit, as the main subject of interest and not the particular campus or the university as a whole.

In brief, the main objective while thematizing, is to gather information about what and how the IIO has changed as an academic unit without deepening into the motives or over-focusing on the UAEI-Institutional level. All of this, in the interest of concluding over the change typology that IIO has presented through the years.

When undergoing the second stage, the design of the study focuses on knowledge collection more than knowledge construction (Kvale & Brinkmann 2009) since it explores on the what and how of the changes while never contemplating on the why. In order to develop a true knowledge collection, the six dimensions are reviewed in the theoretical framework and afterwards developed in the different set of times. Therefore, the intended results of valuable information are concentrated on determining which changes had a neo-institutional perspective, which ones had a resource dependency perspective and if there was actually the presence of both. As seen on Table 2, each question from the interview guide was predetermined to one of the perspectives or both in order to decode the information on the latter analysis phase.
Table 2 Predetermined categories for questions from the interview guide in relation to the two organizational change perspectives

<table>
<thead>
<tr>
<th>Question</th>
<th>Neo-Institutional Perspective</th>
<th>Resource Dependency Perspective</th>
<th>A combination of both perspectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Do you consider, that during this period, the IIO had, true and full, autonomy in the particular area of teaching and research? Yes ___ No ___ Why?</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Where there resources that where obtained by the IIO on its own? And did the use of those resources where somehow limited by UABC or another instance?</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>4. Was there any sort of conditioning in regards to reception of resources related to particular research subjects?</td>
<td></td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>5. Taking into account the Humboldtian philosophy where solitude and freedom, autonomy from the state and the search of knowledge for its own sake are of main importance (including basic research). Was this principle applied in IIO?</td>
<td>●</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>6. On the topic of how researchers have had to become their own &quot;research managers&quot; (e.g. managing research budgets, generating reports, special requirements for particular research or acquisitions, to name a few). Did it happen in IIO during your period of time? And was it complicated to achieve?</td>
<td></td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>7. Are there any alternatives that may be applied to ease the budgeting process for researchers?</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. How much do you consider that have researchers gained or lost because of the Researchers National System (SNI)?</td>
<td></td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>9. What is your view of the famous international phrase of &quot;publish or perish&quot;?</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. What where the main problems that you had when it came to budget management? When budgets where authorized late in the year? And if, at the same time, did you have a limit of time for spending?</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Did the IIO loose resources or part of the established budget because of what is stated in the last question?</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Taking into account any policy change from the Secretariat of Public Education (SEP), Mexico’s National Council for Science and Technology (CONACYT) or from any other government organization: Where there changes in teaching and research policies that affected the IIO?</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>13. If policy changes did occur, did they affect the organizational structure of UABC and therefore IIO?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Furthermore do you consider that any of the changes, stated from the previous 2 questions, affected un any way the institutions (UABC or IIO) autonomy?</td>
<td></td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>15. What do you consider where the main side effects for IIO, resulting from the creation of the Center for Scientific Research and Higher Education (CICESE) as a CONACYT Center?</td>
<td></td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>16. Additionally, did the creation of CONACYT Centers in the rest of the country affect in any way IIO? If so, how did it affect?</td>
<td></td>
<td>●</td>
<td></td>
</tr>
</tbody>
</table>
However, when designing the study through documented information and general knowledge of the academic unit, the possibility was always open that the questions might lead to a different perspective than the one that was assigned to.

For the third stage of interviewing, the individuals were contacted previously through e-mail and given freedom to assign a date and time for the interview. They were also given the interview guide and a brief introduction of the thesis topic and why they were of particular interest for the study.

All of the interviews were conducted in Spanish as it was their choice of language. All of the interviews were conducted with the support of a voice recorder.

In the fourth stage, all the interviews were transcribed verbatim, in order to be prepared for data analysis that was directly based on the proposed predetermined categories and dimensions. When moving onto the fifth stage of analysis, all nine interviews had to be organized and analyzed accordingly to the categories as mention on Table 2 as well as the periods of time where the most relevant organizational changes took place, in spite of the individuals and the position that they occupied at that time.

When speaking of the fourth phase of verifying the validity of the study, it is confirmed through the reliability of the positions the interviewees have and have had, which are also confirmed by several

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>17. Where there any organizational changes that where conducted as a result of institutional policies (e.g. in communication, optimum use of resources, creation of new instances for planning).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Where there any researchers, that individually or as groups, have served as advisors for the creation of laws and policies at a local, state or national level?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. What where the policies for “punishment or reward” employed for acquiring programs that were accredited by SEP, CONACYT or any other instance?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. Do you consider that the Coordination for Institutional Planning is an important entity that serves as a governmental policy adapter for UABC or IIO?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. Is there any other administrative entity within the UABC that you identify as a developer of internal organizational changes, derived from the needs or requirements from governmental policies or from another type of source.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. During your period as Director of IIO, were there research networks from a national and international scale? If so, what where the benefits for IIO?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Finally, the reporting phase is reviewed in detail in the next chapter of results, analysis and conclusions.
5 RESULTS AND DISCUSSION

Based on all the interviews, the theoretical framework and the historical information concerning organizational change the results and discussions were divided in a number of periods. Furthermore, these periods were defined in order to enable a thorough analysis of the information from the nine interviews and the name and dates were also selected on the basis of major shifts that the UABC and IIO have had (e.g. an important change of Director or new policy implemented that directly affected IIO).

Accordingly to the research strategy, proposed in the general background of the study, the current chapter will display results obtained on each of the areas mentioned in the specific questions. As stated before, the organizational changes are analyzed a certain period of time in dimensions specifically related to: Financial or administrative areas, legal framework, research projects, study plans and programs or in any other aspect concerning academic entities, social organizations, enterprises and government.

Afterwards, a discussion based on the final results and the proposed theoretical framework, will be presented as the following six periods:

- The beginning of IIO (1960-1968).
- The co-government (1977-1980).
- IIO adaptation to government policies (2001-2012).

5.1 The beginning of IIO (1960-1968).

5.1.1 Changes in the financial area. In this period, while IIO was still an academic unit in a process of consolidation, UABC was also in the process of becoming a well established university.

Since IIO was one of the first two academic units in Ensenada, economic resources were extremely scarce. As an example, it was revealed that the director of IIO did not receive a salary; his work
hours were considered part-time making him economically dependent of his full-time job as General Manager in a cement producing company in Ensenada.

The research body was composed by the teachers and students, who also belonged to FCM. In addition, the majority of the teachers did not receive a salary and had other full-time jobs. The only individual who had an assigned salary was the director (or dean) from FCM. The administrative personnel and some teachers were paid by the hour.

During this period, the support given by two Californian institutions The University of California in La Joya (SCRIPPS) and the Geology Department in San Diego State University (SDSU) was of fundamental importance. The IIO and FCM directors, César Obregón (a geology engineer) and Pedro Mercado (a marine biologist), had personal contact and communication with some of the researchers from both foreign institutions enabling them to receive important donations. Additionally, several of the professors from SCRIPPS and SDSU came to give lectures and teach courses without any type of compensation.

With the collaboration of SDSU and the financial support of the National Science Foundation (NSF) from the USA, IIO was able to undertake many important research projects, such as the Geologic Mapping of the Baja California State.

Furthermore, in 1961 students from the first generation of graduates of FCM invited the president of Mexico Adolfo López Mateos to visit their new-yet still simple IIO and FCM facilities. The president, who showed high interest in the development of both academic units, made several economic commitments which he delivered later on. From 1965 on, several part-time research posts were opened. In addition, many rock and mineral collections were donated to the university by the Goldbaum Museum in Ensenada.

**5.1.2. Changes in the administrative area.** During this period, there was a basic administrative body, the IIO and the FCM shared one facility and IIO only had the administrative position of the director. For all the rest of the management needs and tasks, as well as the communication with the rectory, the director had to rely on the administrative body that formally belonged to the FCM.
5.1.3. Changes in the legal framework. Since UABC was still in a institutional consolidation process, the only existing regulation was the Organic Law of UABC which was very similar to the one of UNAM. Moreover, the Decree for the creation of the two academic units in Ensenada was issued for the IIO and FCM on December 15th, 1960.

5.1.4 Changes in regards research projects. The IIO director requested and acquired, from the state government authorities, all the permits necessary for researchers from SCRIPPS and SDSU to come into Mexican territory and perform research studies. Since the research studies were concerning the state of Baja California, the permits were given under the stipulation that they would be accompanied by teachers and students of the FCM in the form of research assistants.

This framework gave way to a large research project, which was carried out throughout the state and was completely financed by the NSF. The results from this research project were presented by the IIO director in a Geology Congress held in New York city. Additionally, the IIO director developed other geology research projects of the marine continental platform residing in the Rosarito coastal area of Baja California. This particular research was done, because of the Federal Electricity Commission (CFE- Comisión Federal de Electricidad) objective of building and sustaining a thermoelectric plant. Same one that was constructed in the 1960s and is still in use today, acting as one of the main electricity suppliers in the State of Baja California. The results from this study were presented in the I National Oceanographic Congress, which took place in the state of Guerrero in southeast Mexico.

As a result from the type of research required for such projects and the impact they had, gave way for these first research endeavors of IIO to have a well deserved acknowledgement and finally reflected when IIO and FCM were chosen for the II National Oceanographic Congress in 1970.

5.1.5 Changes in study plans and programs. The assistance of the contacts from SCRIPPS and SDSU accompanied by the support of FCM and IIO, the first directors alongside the initial study plans and programs from the Oceanography Bachelor Degree Program, were designed. IIO and FCM were the first academic units of its nature; focusing on the study of ocean science. Moreover, there were no oceanographers in all of Mexico. Therefore, the first teachers were physicists, geologists, chemists and biologists. And it was not until the first generation that graduated in 1965, that oceanographers came to exist in the country. These professionals had a
multidisciplinary knowledge and development in the three main areas of ocean studies: physics, geology, chemistry and biology.

By this time, several of the graduates were abroad studying in a postgraduate program and a number of them went directly into working with important governmental institutions such as Mexican Petroleum (PEMEX), the Sub-Secretariat of Fishery, the Secretariat of Hydraulic Resources, to name a few.

5.1.6 Changes in the relation to other academic entities, social organizations, enterprises and government. During this period, IIO had a close relationship with the FCM. They shared the same facilities, students, researchers and professors. Much support was given, specifically for the two units, by the private and social sector. As an example California Cement (an Ensenada based company) supported the two academic units with donations of books and laboratory materials, as well as for the necessary resources for field practices that the students needed.

In addition, the IIO and FCM directors completed the necessary requirements from the state government which facilitated the permits for SCRIPPS and UCSD researchers to enter Mexico and collaborate with both academic units.

Students from FCM, with the support of the teachers, directors and the Ensenada community overtook land of an ocean front area in 1968. This was done as a demonstration of a social demand, in order for FCM to obtain their own facilities. Formerly, these two academic units worked and studied in an industrial warehouse donated by the Rotary Club, which was not spacious enough for both of the academic units to function properly. Moreover, for the first time there were openings for research positions in IIO as well as an enrollment increase in FCM from regional and national students.

5.1.7 Discussion (The beginning of IIO 1960-1968). The first stage of IIO was definitely within the concept of institutional autonomy, were all the changes and creations made are completely aligned with the neo-institutional perspective. Also, it may be stated that IIO was the first university institute that was focused in the four main ocean science areas in Mexico. It was constituted as a pioneer in its own kind at a national level, which at an early stage managed to
produce highly valuable research projects. These projects only strengthened by the support received from two internationally renowned institutions such as SCRIPPS and SDSU.


5.2.1 Changes in the financial area. At the start of this period, a house was rented to move the IIO to its own facilities. Also, the first budget -even if limited- was received from UABC. The IIO director Katsuo Nishikawa-Kinomura and his team requested and achieved to receive a federal government funding, through the Secretariat of Hydraulic Resources which was aimed for two long term projects.

Also, through Hydraulic Resources IIO obtained the first scholarships for bachelor degree students and their thesis projects as well as equipment, laboratory and field work material. In addition, the IIO director frequently invited local, national or North American individuals or groups to divulge what the IIO was doing at that moment. It is important to emphasize that because of these demonstrations the IIO obtained numerous important donations and research support.

As a result from the aforementioned student movement and with the main support of state and federal government, the ocean front lot was officially delivered and the construction of buildings was underway. The new building was occupied with assigned academic and research areas in January 1974.

5.2.2 Changes in the administrative area. Nishikawa-Kinomura, a graduate of the first generation of oceanographers from FCM enters to the position of IIO director, the research body is undersized. This academic body was composed by part-time research positions and thesis students, some with scholarships and most of them with a high interest of doing thesis work related to projects that were managed by IIO together with the federal government. By this period, there was already administrative support. Even though, IIO was still highly dependent on FCM for management matters. In the new facilities, the Direction Office of IIO was again in the same building as FCM.

5.2.3 Changes in the legal framework. Nothing of significance to report within this area.
5.2.4. Changes in research projects. The first two main projects financed by the Mexican federal government were developed and designed by Nishikawa-Kinomura and his collaborators with absolute freedom and autonomy. These projects were directly related to basic environmental frameworks in two very important regions within the state of Baja California: The San Quintin Bay in the south of Ensenada and the High Gulf of California. Lastly, it is significant to point out that these projects gave birth to many FCM student thesis.

5.2.5 Changes in study plans and programs. During this period, several of the teachers were FCM graduates; many with postgraduate degrees obtained in foreign universities, mainly from the Oregon and San Diego State Universities. The teachers, based on their experiences abroad, start to analyze and improve the study plan of FCM further which resulted in changing the duration of the bachelor degree from four to five years.

5.2.6. Changes in the relation to other academic entities, social organizations, enterprises and government. The close relationship between the IIO and the FCM continues, due to many factors, such as the fact that most of the teachers from FCM were also researchers in IIO. Also, the students from FCM worked on their thesis in IIO.

The Center for Scientific Research and Higher Education of Ensenada (CICESE) is created by CONACYT and SEP in 1973, which was supported by IIO and FCM from UABC, as well as the Astronomy Institute from UNAM who already had facilities in Ensenada.

From the threshold of CICESE, they had a close relationship with IIO through joint research projects in which they shared researchers and facilities. Also, the liaison with SCRIPPS and SDSU continued, given that the students from all of the mentioned institutions did research practices in either Baja California or California. Additionally, students and researchers from IIO and FCM had research trips on board of oceanographic ships from SCRIPPS alongside the coast of both sides of the international border.

During this period, much exchange was made between IIO and the social sector through the Fishery Cooperatives, since IIO analyzed their issues and proposed research that focused on problem-solving situations specifically suited for the company. An example of the work done with the Cooperatives would be the establishment of fishing bans over valuable resources such as abalone and lobsters, which in those times were reasonably abundant in the region.
The first experiments regarding life cycles (reproductive biology) of important species from the economic point of view were started with the endeavor to introduce the first marine aquaculture systems in Mexico. During these years, a close relationship existed with the local, regional and federal government. As an example, the president of Mexico Luis Echeverría Álvarez acted as a sponsor for the eight generation of graduates from the FCM. In addition, he paid a visit to the IIO facilities and was interested in the developed research and, consequently, the institute received further support during his period in term in office.

5.2.7 Discussion (The Nishikawa-Kinomura period 1969-1976). The period may be considered as the definite beginning for the IIO as an autonomous research facility, since the research projects developed during these years were done, for the first time, by the institute. Even though, the projects were financed by the federal government, there was no interference in the approach, objectives or aims; these were completely defined by the IIO.

In the same manner, all the necessities of the social sector (Fishery Cooperatives) and government regarding fishing bans as well as the studies that where a novelty at the moment such as aquaculture, were generated within a complete autonomy. The undergone organizational changes during this period of time may be considered of a neo-institutional nature. On the other hand, the creation of CICESE, as a research institute focusing on the same areas as IIO (marine science) and the establishment of many other CONACYT centers around Mexico, was an outcome of a fear that the federal government had over the complete autonomy that many universities had, and the lack of control over them. This decision was also based on the many strikes that were taking place around Mexico, eventually affecting the research programs and the preconceived plans of the universities. Consequently, these events gave way to the creation of all of the new research centers, with a large amount of investment that could have been applied for strengthening human resources, facilities and infrastructure of the already existing IIO.

5.3 The co-government (1977-1980).

5.3.1 Changes in the financial area. During this period, IIO had the sympathy of president of Mexico, Luis Echeverría Álvarez. Thus, much neighboring land of the first obtained space was acquired for IIO and FCM.
Furthermore, other resources were provided such as vehicles, busses and laboratory equipment. The number of full-time research posts increased as well as the work support from students as research assistants, due to the internships and thesis work they did at IIO. The new resources enabled an increase in the number of projects with no need of added financial resources.

Also, a decision was taken in regards to a request for support, directly to the president of Mexico, for the development of research that would directly link the participation of students with certain types of projects. In order to achieve this, students, academics and the Research Coordinator travelled to Mexico City where they were interviewed by the Mexican president, who in the moment wrote a check under the name of the rector of UABC Rigoberto Cárdenas Valdés (Figure 3).

The check was received by the Research Coordinator and two academics. Additionally, they received airplane tickets to travel to China where aquaculture was being developed in an advanced manner. This was an important event since it defines the beginning of joint research with other countries apart from the USA. With the obtained financial support they acquired laboratory equipment and materials, vehicles and resources needed for the proposed project of research oriented teaching.

![Figure 3](image_url)  
Figure 3  Check from the Federal Treasury that was given to the IIO Director, then called the Research Coordinator from the Co-government
However, the unity of IIO and FCM as a co-government had an unstable existence which also possessed the lack of recognition from UABC’s central management. The type of organization gave way to a decrease of economic support and an increase of inconformity, as well as unrest within the antagonistic political groups (extreme right and extreme left) that existed in both academic units.

After several student strikes, many of them generated by different pressures, such as students having to wait in order to enroll in science oriented programs, which was the tendency in that decade. The FCM, amongst many other academic units with science oriented programs, was forced to receive more students than they were able to manage or attend to. This unleashed a general strike in October 1980 lasting until January 1981 and gave way to the direct intervention of the rector who had the support of the state and the federal government.

5.3.2. Changes in the administrative area. The Co-government was a structural effort to unify the IIO with FCM, in what was called the Marine Science Unit. The decision making was done in General Assemblies formed by researchers, teachers, students and administrative personnel. The unit had no directors at the time, the denomination of their leaders were: the General Coordinator (who would have been the FCM director), the Research Coordinator (who would have been the IIO Director) and the Teaching Coordinator (who would have been the FCM sub-director).

5.3.3 Changes in the legal framework. During this period, a series of regulations were created outside the university which were written by the academic and student leaders delimiting and defining the functions of their authorities. The General Assembly was named as their maximum authority and many Coordination areas and Commissions were also defined, amongst them were the University Extension and Social Sector Network.

5.3.4 Changes in research projects. Because of the research developed until those years, first mariculture was produced in all of Mexico. Also, an important research project regarding mussels was developed and its aquaculture production was initiated in Baja California. During this period, two researchers were sent to be certified on the cultivation of Japanese oysters *(Crassostrea gigas)* in the state of Washington, USA. When returning to Mexico, they immediately departed to San Quintin Bay to qualify members of the Fishery Cooperative. Finally, the cultivation of the species was formally implemented in the zone. Same area that had been studied during the early stages of IIO.
5.3.5. **Changes in study plans and programs.** In this area, new subjects were introduced to the study plans and programs. A growing interest of acknowledging the relation between science and society had taken place. Therefore, new additions were made with subjects such as philosophy, sociology, science and society and other courses concentrating more on holistic, human and social aspect.

Even before this period, there were several foreign teacher-researchers. For example, by the end of the 1970s there was one researcher from the UK and four from USA. Their presence was in part due to the competitive salary for full-time research positions which were equal to the ones in the USA or the UK. When the co-government period begins, all the teacher-researchers decide to return to their countries of origin. At the same time, three Chilean researchers are incorporated to the research institution, who sympathized with the co-government ideal, as well as many other researchers who came from UNAM in Mexico City.

5.3.6 **Changes in the relation to other academic entities, social organizations, enterprises and government.** The relationship between the two academic units was so close that they created only one. Any type of international interaction during this period was scarce. Little by little, the visits to SCRIPPS began to decrease until they stopped. In contrast, the relations with the social sector increased. There were several biotechniques for mariculture production that were transferred to numerous more Fishery Cooperatives. Furthermore, new Cooperatives were formed by graduates from the FCM, which focused on the new species introduced to this the BC region (such as shrimp aquaculture).

5.3.7 **Discussions (The co-government 1977-1980).** The IIO underwent organizational changes as being part of one single Marine Science Unit that was never recognized by UABC. Because of this, the three year period has a clear neo-institutionalism approach to change, at the level of academic units and without recognition from the institutional level. The courses of science and society revealed to have an important role in the conscience of students in regards to their responsibility to develop solutions for social problems.

Furthermore, it may be considered that the period is in accordance with the Humboldtian philosophy, since there was a real freedom for researchers, teachers and students alike, in what was the selection of research subjects, including the option of basic science research. Even so, this period of purely neo-institutional organizational change was deteriorated due to the neglect of
important academic aspects, as well as its strong political content that resulted in antagonistic groups between academics and students.

Because of the political and social problems amongst members of the university community, which were not only happening in Mexico but also in several other countries of the world between the year 1968 and 1972, the external pressures started to be visible. One of these pressure factors was induced by the government through SEP. They were motivated to initiate changes in order to differentiate public universities and its academic units in regards to what was related to quality and quantity of products (graduates, research projects, publications, postgraduate programs in the excellence patters, etc.).

The universities started to be classified into three categories according to their production and quality levels. Also, budgets were assigned through a *reward and punishment* policy. Therefore, the organizational changes in universities were threatening their autonomy and they were forced to direct their institutional policies in accordance to governmental policies in order to receive larger budgets, support or resources.

**5.4 Institutional organization (1981-1993).**

**5.4.1 Changes in the financial area.** A sudden change followed the general strike of more than three months, which finally came to an end in January 1981. The outcome was an ample period of reorganization of all UABC. These changes also affected IIO.

Additionally, from 1976 until the end of this period, there were several substantial currency devaluations, the Mexican Peso was at a loss as never seen before. The ongoing economic crisis had historical figures such as the annual inflation of a 100% and more.

In spite of the country’s situation, IIO achieved an important growth with the appointment of more full time researchers with Ph.D. levels through a "repatriation program" implemented by CONACYT from SEP. The program was offered to researchers, who returned from studies in other states or abroad, a year's full-time payment, after which SEP guaranteed a full-time position in UABC in order for them to continue as IIO researchers.
During this period, research projects were partially financed by UABC. However, the most important income of resources came from SEP as well as other external national and international sources. Although, one of the observed problems with federal budgeting for research, was that these financial resources were approved at the beginning of the year, but arrived to UABC central management at mid-year or at the end of it. As a result and in many occasions, these budgets were used on needs other than research projects.

Also, the postgraduate degrees in Biological and Coastal Oceanography were created in this period, both within the parameters of the Patron of Excellence from CONACYT. Because of this, resources were given to IIO for scholarships as well as for infrastructure and equipment. Furthermore, the first three buildings of IIO were constructed and were assigned for aquaculture laboratories, management areas and cubicles for the teacher-researchers.

In 1991, SEP creates the Inter-institutional Committees for Higher Education Assessment (CIEES) that were collegiate bodies composed by high level academic pairs belonging to HEI from all over the country. Its most fundamental objective was to assess the functions and academic programs provided by HEI, in order to create an assessment culture. These bodies started working directly with the accreditation of academic programs which had a clear tone of the resource dependency theory.

During this stage, changes were made in the salary scheme of UABC to be applied in internal salaries with a re-categorization of the academics through the Academic Personnel Statute (EPA). Also, salaries varied due to external schemes. One of them was the creation of Researchers National System (SNI) in 1984. In the same manner, other stimuli were developed by the federal government throughout CONACYT and -in numerous occasions- directly from SEP. Furthermore, many requirements were expected to be fulfilled in order for postgraduate programs to belong to the Excellence Patron and be eligible for grants.

5.4.2 Changes in the administrative arena. In 1988, the rector of UABC Alfredo Buenrostro-Cevallos decided to create the first Ph.D. program in the university. Since it was decided that the program should involve two academic units, the IIO and FCM were selected.

Also, important changes were done in the EPA in order to be able to offer a competitive salary to the new doctorate level academics. This was decided and achieved within a complete institutional
autonomy. An important reason for this particular decision to be made was that the number of Ph.D.
level academics was quite low all over the university and particularly in the two academic units
where the new program was to be implemented. It was also a period of high inflation; the salaries
were obsolete and the repatriations of many of the CONACYT scholarships were lost because of
the low competitiveness of the salaries in UABC. The changes in the EPA also permitted UABC to
offer researchers (national and foreign) salaries that equaled the amount of 1,500.00 American
Dollars, which was the equivalent of a postdoctoral scholarship in the USA at the time.

During this period four main areas were clearly defined: Physics, geology, chemistry and biology.
Researchers are divided amongst these areas. Thus, the Head of Area position was created. Also
other changes occurred on an instructional level where IIO actively participated (through work
groups) in order to define Technical Research Councils, as well as to develop a process for internal
research project assessment.

Furthermore, due to the growth in central management and UABC’s ever-growing centralized
manner, communication issues surfaced between the management and the IIO. This aggravated the
budget situation, since a fraction of the external budget that came late on the year for IIO was first
delivered to UABC central management. In addition, in several occasions, this budget was not
transferred immediately to IIO and, by the end of the fiscal year; part of the budget had not arrive
for the IIO projects.

In other matters, the Academic Syndicate created as an initiative from the IIO researchers in 1981,
reassured their labor rights and developed a pensions fund, same one that has permitted retired
academics from all over UABC to keep receiving the same salary as the academics that are in
service. Also, the central management of UABC created the Academic Personnel Statute which
defined rules to contend and obtain positions; enabling a clear differentiation between labor rights
and academic rights.

5.4.3 Changes in the legal framework. From 1982 on, UABC undergoes a complete
university regulation process since the only existing regulation up until that time was the Organic
Law of UABC drafted in 1957. The General Statute was created which provided all legislation for
the highest positions such as the University Council and the rector moving on to all the academic
units, technical councils, campuses, academics and students. Also, the General Directions where
created at UABC central management.
Operating manuals for all the academic units were generated, as well as the introduction of budgeting by programs which stated specific objectives, times and resources.

**5.4.4. Changes in research projects.** The freedom to select subjects for scientific research projects remained, researchers developed projects according to their interests and specialization varying from basic to applied science. Also, students had complete freedom the selection of their thesis subject based on an ample range of already existing projects. Additionally, the IIO director completed resource assessments for several government dependencies in the private and social sector. In addition, the number of researchers with Ph.D. level increased, new lines of research was opened, where researchers from different academic units from inside and outside UABC took part. Also, internationalization grew due to the new researchers that came from universities around the globe (USA and Europe, particularly the UK).

**5.4.5 Changes in study plans and programs.** In this period, the first Ph.D. programs in marine science were created between the IIO and the FCM; the Biological Oceanography program in 1985 and the Coastal Oceanography program in 1990. All the plans and programs were designed by the academics with complete autonomy and only the parameters for the Excellence Patron were set by CONACYT.

**5.4.6 Changes in the relation to other academic entities, social organizations, enterprises and government.** There was an increase of relationships with other academic units ranging from UABC, CICESE and several other institutes and universities throughout the country that had teaching and research related to marine science. There was participation of IIO in state and federal government commissions, for the analysis of marine, fishery and environmental problems. IIO disclosed, at a national level, the advances of aquaculture they had. Also, international networks were developed in order to experiment with new species with the objective of analyzing the feasibility of growing them in aquaculture camps throughout the coast of Baja California.

**5.4.7. Discussions (Institutional organization 1981-1993).** The changes done by the rector to the Academic Personnel Statute were conceived within full autonomy, thus considered to be of a neo-institutional nature. The changes were also discussed and analyzed by the IIO personnel, since it permitted them to have the required Ph.D. level academic staff they required to sustain their first Ph.D. program. Moreover, the concern was the ability to offer extraordinary salaries for the times lived under an economic crisis, which also allowed IIO and the FCM to have renowned researchers,
many of whom were retired from their own countries. Also, this strategy enriched in an important manner, the scientific community of Ensenada as a whole (UABC as well as CICESE and other organizations).

The concern for student movements and unrest in public universities resulted in the implementation of measures and regulations by the federal government with the support of SEP; something that had never been seen before in Mexico. In the specific case of IIO, the drastic organizational changes done after the general strike were within the university autonomy and decided by the rector, thus neo-institutional. Nevertheless, government interventions shaped the university’s legislation in several ways. It may be stated that both approaches (resource dependency and neo-institutional) are clearly observed.

For the first time the appearance of a syndicate was born from the initiative of the IIO researchers. This may as well be considered as a fundamental achievement for labor security issues of professors and researchers all over the university. This change itself is of completely neo-institutional nature and it was led by IIO.

The Excellence Patron from CONACYT was another way to catalog postgraduate programs into first and second class. Also, it was a measurement that generated change in order to receive resources. However, the question remained: if there was institutional autonomy or not, since the rules existing over postgraduate programs was sometimes disrupted, an example of this was the terminal efficiency of the postgraduate programs that were always one of the problem areas.

In the same manner, the CIEES where born with the initial intention of HEI to enter an assessment culture which ended up forcing all the academic programs into procedures of accredited or non-accredited classification (e.g. the institution had to condition their resources to the outcomes).

During this period, the scholars had a differentiated income through the re-categorization of the Academic Personnel Statute and the SNI, which was positive as an incentive for academics in regards to quality assessment. Nevertheless, there were many cases when the measurements of quality were not necessarily accurate. As an example, the fact that researchers were being "measured" by the number of publications they produced per year, it sometimes translated into researchers producing several publications instead of one full and consistent one.
There was a competitiveness that had given way to antagonism between research groups within the IIO. Also, the fact of belonging to the SNI or not, has generated great unhealthy pressure over researchers. Therefore, these changes may be categorized as a resource dependency theory.


5.5.1 Changes in the financial area. IIO made profits with the first projects of technological innovation generated by them. Also, a 10 year plan with defined goals and objectives was developed for IIO for the first time which was financed by UABC.

Amongst the changes in the federal government policy towards HEI was the bachelor degree program accreditation, which had its impact on IIO due to the large number of students with a bachelor degree that participated in research projects (interns and students with thesis work). These students were not only from FCM, but from other academic units of UABC, as well as other universities. The scholarships for students working on their thesis were conditioned to their programs being accredited or not.

Another important change which had a direct impact was the re-categorization and requirements for researchers, which stated that all of them had to be teaching. It is important to point out that it was not considered mandatory before. Furthermore, salaries depended on the number of classes given.

Between 1994 and 2000, SEP implemented programs from the Higher Education Modernization Fund (FOMES) which enabled the IIO to obtain many resources for equipment and research infrastructure. New laboratories were constructed and others reconditioned. The SNI went on and there was an increase of IIO researchers to be accredited by them, in consequence, there was a great increase in their salaries. The postgraduate programs were maintained in the Patron of Excellence from CONACYT and with this many scholarships are granted as well as support to strengthen the already existing laboratories and marine infrastructure for student field work. During this period, the IIO improved its communication and information services (phones, computers and other similar necessities).

Since the budget for research was given by UABC to IIO, it was considerably limited. This was only used as a base to achieve other supports from national and international agencies enabling to receive a much larger amount of resources for their projects. The accountability issues were of great importance from the internal (IIO and UABC) to the external (SEP and many other instances).
Communications in this area were done through reports, academic development and researcher’s productivity levels.

5.5.2. **Changes in the administrative area.** The General Directors from central management UABC possessed too much power and hindered the work of the academic unit directors. As an initiative of the IIO director a state meeting took place with all the UABC directors, were this hegemony was changed and the director of an academic unit had complete authority, it was also stated that the direct supervisor would be the rector himself.

A few years later, the IIO Development Plan gave way for the rectory in UABC to require from all the academic units to develop their own Development Plan.

The organizational structure of UABC changed and the central management became more demanding. Also, many of these changes were not done by choice but they were mandatory in nature and also a conditioning rule in order to have access to resources and budget. Additionally, academic pairs started to assess the programs analyzing them in a thorough manner. The great advantage for IIO was that their academics were capable in this type of assessment due to their experience in their field. And as a result were able to sustain their postgraduate programs within the Patron of Excellence. Also, the IIO created the Network and Technology Management Coordination with the main objective of promoting projects focused in innovation technologies.

5.5.3 **Changes in the legal framework.** The Academic Personnel Statute of UABC undergoes certain changes which constrain all the researchers to teaching hours in order to receive what was called the Teacher Performance Scholarship. This forced many of the IIO researchers to apply for courses to teach in other academic units from UABC and in many occasions they could not find available courses.

In 1993, another important internal organizational change: For the first time in the history of IIO, the rector issued an open call for to the candidates that ran for the director position to draw up a period work plan. Based on these plans, the rector selected a group of candidates he would later send to the UABC Government Board, since they were -and still are- the highest authority in UABC and the entity that selects the academic unit directors. Before these elections were designed, there was no real competition for the director position; it was directly assigned by the rector to the UABC
government board. For this reason, the change was a very substantial one and was achieved throughout a full autonomy.

Academic growth and development of the IIO researchers was stagnant in a bachelor’s degree level. It was then when they offered support for them to continue their studies in a postgraduate level in UABC or in any other university. Likewise, the administrative personnel (management area) were also offered support to study a bachelor’s degree with the intention of increasing the academic level of all IIO personnel and staff.

5.5.4. Changes in research projects. During this period, basic and applied research projects continued. In addition, projects that sustained a technologic innovation approach were added. For these last ones, an expert on the area was assigned for communication and networking activities, someone that had the language and knowledge skills to understand two sides: the academic as well as the social and private sector side. Based on the fact that the researchers had a great capacity for developing ideas, while in contrast they had no experience in what referred to charging over a provided service.

Some of the highlights amongst these innovation and networking projects, were the Oceanographic Instrumentation (development of instruments and equipment of particular use in oceanographic research) where thermographs were constructed at a competitive price. Also, the Aquaculture Demonstration Farm (Granja Demostrativa de Cultivos) was developed as a project that contemplated several different marine species. A permit for this particular project was given by the Aquaculture Direction in Mexico City. The fact that IIO received this permit was quite unusual, but considering that IIO was a pioneer institute in the area as one of the main difficulties for any academic unit of a state university was the dependency on the federal government. From this project, several products were developed such as canned mussels that were sold directly by the institute.

5.5.5 Changes to the study plans and programs. The bachelor degree program accreditation operated by SEP constrained academics into carrying out some adjustments. Also, as stated before, the fulfillment of all the requirements to maintain the plans and programs under the Excellence Patron continued. During this period, the postgraduate programs (Master and Ph.D. levels) in Coastal Oceanography continued.
5.5.6 Changes in the relation to other academic entities, social organizations, enterprises and government. In order to have a true sustainable development of IIO, the director of IIO Efraín Gutiérrez Galindo developed the idea of creating an environment where a constant communication between university-government-private-social sectors alongside the financial sector existed. Promoted in a different set of ways, one of them directly approaching financial institutions such as National Financial (*Nacional Financiera*), which belonged to the federal government, in order to analyze economic feasibility of specific projects.

Also, much was done in regards to IIO image, through communication media while trying to provide information to the community of the activities and development of IIO. The institute continued to have joint work with CICESE, and due to the solid joint research done by IIO-FCM-CICESE, Ensenada was distinguished in numerous summits and events.

5.5.7 Discussion (Government policies for HE 1994-2001). Even though the government policies implemented by SEP gave way to the simple phrase of "*adapt or do not get resources*", many of these adaptations were still being made within an autonomy framework, because of either personal belief or philosophy from the researchers in regards quality; this changes where done in an effortless manner. Because of this that IIO never experienced a "punishment" as other academic units in UABC did, when not complying with requirements, in teaching or research, mainly due to IIO tendency to be in an *avant-garde* of its disciplinary area.

Another important aspect to discuss are the Mexican government policies, towards HEI, which have always been more focused in rewarding research rather than teaching, as well as the SNI system that was still being discussed, since it had many positive features. Nevertheless, causing an increase of pressure over researchers, while at the same time SNI was not a real quality guarantee over the produced research.

What was difficult to achieve, was to ensure that researchers were being accustomed to work under ten year development plans, there were some features of resistance to change under this subject.

Another problem was the strong change that was confronted in regards to the Academic Personnel Statute of UABC, which in a hasted manner started to reward teaching in times when researchers found it difficult to find enough courses to teach. As a result, this change may be categorized as neo-institutional.
Another disadvantage for IIO within the university was that for the rectors (from a sociopolitical point of view) the academic units that provide teaching would always be perceived as more important than the ones that focus on research. This was due to the fact that most of the Mexican public university rankings focus on the number of students, the number of programs and the enrollment capacity. This factors are frequently different to the regions needs, as an example this approach has generated unemployment, even if the HEI was not obliged to provide employment itself but well prepared professionals. In the same manner, it was not the government's responsibility to create employment but more as the duty of the private sector.

On the other hand, the fact that IIO started developing innovation technology projects permitted the institute to have much more authority and presence in the community, since applied research tends to be more attractive that pure (basic) science research. However, IIO has never stopped developing pure science; most of its most prestigious researchers were and still are dedicated to this area.

5.6 IIO adaptation to government policies (2001-2012).

5.6.1 Changes in the financial area. Researchers of IIO have never lost their autonomy in what refers to freedom for seeking different financial sources and the development of research designed by them.

In 2007, the Teacher Improvement Program (PROMEP) came into place as a strategic program, created by SEP with the aim of increasing the level of teacher training, on the basis of HE profiles, with the objective of boosting growth of the academic bodies as well as quality in HEI. Through this program, IIO has gained many scholarships so that their researchers may study postgraduate level programs in Mexico or abroad and also open full-time positions for researchers with Ph.D. degrees. PROMEP also offered the reinstatement of the researchers who have gone abroad with their support, as well as salary increase for academics that meet the desired profile.

In addition, PROMEP created the Higher Education Dependencies (DES) which generated some issues based on the fact that they have a department-like structure, when UABC is structured in academic units that are independent from each other. The DES have constrained many researchers from different academic units into working together, and it has been quite difficult due to high resistance from the researchers side.
IIO continued with projects that resulted from their own networking efforts, which generated resources for IIO, and UABC came to an agreement with IIO over the distribution of earnings, 40% was for the IIO and 20% for the researcher. Also, SNI had led to patent registration for projects of innovation technology, in a manner that one patent equalled two arbitrated publications.

Additionally, since equipment and research laboratories are costly, in this last period the directors of IIO have inquired for external financial resources from national agencies. Such was the case of the Aquaculture Food Production laboratory that will open during the end of 2012 and was completely financed by the Secretariat of Agriculture, Rural Development, Fishery and Food (SAGARPA).

5.6.2 Changes in the administrative area. The UABC rector Alejandro Mungaray Lagarda (2002-2006) created three main campuses with their own vice-rectory and un-centralized decision making attributions. The effort was sustained due to the overly used power of the General Directors from central management, which were reduced to General Co-ordinations with the aim of pulling away management from the academic arena.

During this period, there was much work accomplished through the Academic Unit Directors Board that existed in every, which allowed them to unite efforts for achieving important campus goals. Also the position of a manager per academic unit was formally created, in the case of IIO, with the aim of supporting researchers in complicated requirements and financial statements that many government groups demanded when supporting research projects.

The UABC rectors have a four year term without the possibility of reelection. This has been seen as a problem by some of the late IIO directors, who themselves have had eight year terms. For example, the current director Isaí Pacheco Ruíz has worked with three different rectors, which has brought about a natural loss of time and effort as well as interpersonal adjustments done with each of them.

5.6.3 Changes in the legal framework. In 2003, as an initiative from the rector, regulations for all academic units were implemented and an academic body of IIO was chosen to develop a regulation for all the rest of the research institutes in UABC. There were also important changes done in the General Statute of UABC, which gave way to the vice-rectories, campuses and other substantial changes such as the shift from General Directors to Coordination. All of these changes were done within institutional autonomy.
On the other hand, there were changes that were completely external and mandatory in IIO. An example of such is the recent certification process that the IIO went through by a federal government entity: the Federal Bureau for Environmental Protection (PROFEPA).

5.6.4 Changes in research projects. In this last period, many internal changes in UABC have facilitated the IIO researchers to work with the creation of the Academic Information Department that gives communication and information technology services to all the university. For the particular case of IIO, it has been of great benefit for many research projects, especially in the physics area. Where large amounts of information were used, that would have been impossible to manage without the proper information technology infrastructure generated in the beginning of this period. Today, IIO is independent in its technical support services and has its own information technology services substation at the service of the students, teachers and researchers.

Furthermore, the research areas have become even more diversified than past periods, research tends to be under multiple structures and done through joint projects from several different academic units or even universities. Also, nurtured by different networks that have been established during the years.

5.6.5 Changes in study plans and programs. Another Ph.D. program of IIO was created in 2005, in collaboration with the FCM and the FC. This program, similarly to the past ones, has always been in the Patron of Excellence from CONACYT. In the case of bachelor degree programs, the number of study years is being reduced all over the country. At the present time, the bachelor degree in oceanography is once again a four year program and it is planned to be reduced to three. In this manner, as part of the university internationalization process, the tendency goes in accordance with the European and North American model (3+2+3) three years of bachelor degree studies, two for a master’s level and three for a Ph.D. level.

5.6.6. Changes in the relation to other academic entities, social organizations, enterprises and government. The relationship between IIO and the other UABC academic units has increased. Joint projects are more common with academic units different than FCM and FC, such as the Agriculture Science Faculty and the Engineer Institute from UABC Mexicali, as well as the Chemistry Science and Economics Faculty from UABC Tijuana. This is also due to government policies that focused on economic support based on the development of interdisciplinary projects. There is an increase in the number of permanent committees and commissions where IIO
participates. Some examples from federal levels are: SEMARNAT, CONACYT, SAGARPA, Marine Secretariat and many consultation groups belonging to SEP.

On the other hand, in the last few years, programs have been implemented with the intention to introduce IIO potential to the community, as an important support at a local and regional level, and over time to be regarded in the same manner from a national level. At present times, there are two proposals in areas regarding fishery, aquaculture, climate change and oceanography which were presented to the Congress of the Union (the Senate and Chamber of Deputies).

The IIO commissions have also managed to promote changes in national guidelines of important aspects that include waste water purification procedures for reintroduction to the ocean, water management (bacteria levels in drinking water, water for human use, beaches, bays and deeper ocean water), marine current studies of all Mexico (Pacific, in the Gulf of California and Gulf of Mexico), coral reef studies with the ends of knowing geological history, the presence of heavy metals in marine organisms, coastal and marine pollution levels, and many other subjects.

At a international level, IIO has the National Center of Oceanographic Data recognized by UNESCO, there is also the support from the Costeau Society in a French-Mexican relationship and also IIO is part of international meetings and summits in regards climate change.

In relation to the social sector, that IIO has never unattended, there are many traineeships and courses given to the Fishery Cooperatives on the subject of new aquaculture technologies. Following a direct communication between the productive sector and the researchers, as well as a mutual support, that has also given much credibility to IIO in a regional and national level. IIO is developing another new project with the support of the Faculty of Engineering which is focusing on the management of technology, process improvement and the strategies for added value for aquaculture products.

5.6.7 Discussion (Adaptation to government policies 2001-2012). As mentioned before, the rector’s term is of four years only whereas in IIO there have been double terms with a total of eight years. Furthermore central management has four year development plans, while IIO has ten year development plans. These discrepancies sometimes make the programs incompatible in many ways.
Within the university, IIO distinguishes itself by having the larger amount of SNI researchers, Academic Bodies, Research Networks and PROMEP profiles. One of the reasons may be due to the fact that most of its researchers have studied abroad, which has provided them with a broader view of HE and its challenges.

In regards to the apparent loss of autonomous decision making of the university as well as IIO, it is considered that much autonomy remains amongst researchers themselves, since they are still deciding on their funding sources. Although, these sources (government, private sector or others) have well defined priority areas and the researcher has to always propose projects that fit these areas. For this reason, these types of organizational changes may have a mixture of both integrated approaches (Neo-institutional and resource dependency).

The SNI is still being questioned further, such is the case of the researchers with the highest SNI level, when they lose interest in giving lectures to bachelor levels or in giving students internship opportunities, they are more interested in teaching in postgraduate programs and advise students from this level. With this, the relationship of highly prepared academics with younger students interested in science areas is lost, when being in a country that is trying to promote programs that are science oriented, and to maintain the students that enroll in them. Also, there has been a high promotion of patent registry by the SNI system, all though researchers lack government support when it comes to paperwork; it is still a considerably bureaucratic process.

Amongst the rectors and UABC stakeholders, there is an important discussion in regards the future of the university whether it should continue its growth or not. In the opinion of one of the ex-directors from IIO, the university may be as large as it needs to be but to accomplish it in a decentralized manner. Using North American universities as an example, campuses tend to be independent with its own rector or chancellor. He also stated that there are other models to follow as long as UABC remains the only state university in Baja California as the creation of another university would signify dilution of capabilities and efforts. Such was the case of the state university of Sonora, where a second state university was founded because of the political problems that existed in the first one during the decade of the 1970s.
6 CONCLUSIONS

6.1 Conclusions

The researchers from IIO have always distinguished themselves as being constructive critics and highly participative individuals; something that has been diffused throughout the university. This generated that the proposed ideas to flow from IIO to UABC. Also, numerous of the organizational changes described in this study, which were done at a university level are result of their initiatives.

It is relevant to discuss and conclude over the concept of autonomy, and how it has been decreasing throughout the years, not only in UABC but also in most autonomous state universities of Mexico. Even though researchers from IIO have autonomy in regards sources, research subjects and networks, there are still a large number of requirements to comply with for obtaining financial support. Additionally, in many of the cases the projects have to be customized in order to fit specific calls for research and journal papers, for both the private and public sector.

Another fundamental aspect is how universities and their academic units have less influence in the academic design of the plans and programs, since these schemes come from the government to the university while following international policies. For this reason it is considered important that UABC, through its internal collegiate bodies such as the Academic Groups (a cluster of academics that belong to the same knowledge area and are established in the General Statute), to analyze these changes and their effects in order to determine up to what degree these changes are desirable. Furthermore, these bodies can state if these effects are considered as adequate or on the other hand somewhat harmful for the university.

In regards to SNI, it is still considered as a positive system since it represents an increase to the researcher’s income. Nevertheless, the mentioned pressure generated over them has led to many cases of anguish and even health issues. In the same manner, as researcher’s age, this pressure of sustaining themselves in the SNI system is stronger, since leaving it would be a sign of discredit. Based upon this, SNI has prompted an organizational change for obtaining resources with several edges that has motivated the best of the researchers (SNI level 3) to not be interested in bachelor level courses, since the master and Ph.D. levels are better ranked within SNI. Meanwhile, we go back into the first years of IIO and FCM (1960s) where important scientific leaders gave courses
and lectures, as was the case of researchers from SCRIPPS and SDSU, a time where individuals gave more than what they got paid for. Also, there is a decreasing interest of students in science-oriented subjects, not only in Mexico but world-wide, were they can be motivated and tutored by successful researchers, if they are also supported to do so.

Additionally, it is highly discussed if SNI is designed to fit and benefit the states and regions where the state universities are located. This based on the fact that many academic units from UABC have several high level SNI researchers and also have prestige in their discipline, although having never produced research that is related or in the benefit to the state or region. Fortunately enough, this is not the case for IIO.

Therefore, there is a strong query about whether SNI has been a true benefit for Mexico or not, if it has been just another model copied from first world countries, which has no fundamental value for Mexican public universities. Also, taking into account that public HEI in Mexico are expected to have a true calling of service to their community for state-wide and regional problem solving.

Another incentive promoted by CONACYT is to reward patent registration, although in Mexico it is an extremely complicated procedure, even more when a researcher is more than 3000 km away from Mexico City, which is the case of all researchers in IIO Ensenada.

It is also important to point out that the governmental policies in Mexico, for HEI, have been always focused on how to reward research over teaching. For example, when it comes to teaching marine science, it is much needed to study how to teach science, something that has never been recognized or rewarded as a scientific research is. In the same manner, PROMEP which as its title states: a Teacher Improvement Program offers much more benefits for researchers than teachers.

Furthermore, for the intention of the present study by a document and theory analysis related to organizational change the tools that where repeatedly chosen for its analysis where the neo-institutional and resource dependency modalities. Even so, the majority of these studies are developed under an economic or social focus and many of them are related to either public institutions or private companies. Since the objective of this study is to analyze the institutional change in an academic unit that was part of a HEI and to observe how these changes have been prompted in an indirect manner by government policy. The study developed by Gortnizka (1999) was chosen since it reviewed these two perspectives in a HEI and gave important analytical value to the thesis.
Finally, it is concluded that the first three periods analyzed where fundamentally neo-institutional in nature, ones that permitted full growth and development in IIO under an autonomy oriented environment. Afterwards, because of the socio-political movements in Baja California from students and academics during the 1960s, a phenomenon of national control lead by the federal government came into action with the aim of maintaining and increasing quality in HEI. With these controls a series of programs and regulations, linked to resource access, lead to a strong organizational change that presented a high tone of the resource dependency approach. In Addition, after observing the results, it may be also concluded that the changes implemented by the Mexican government from the decade of the 1980s on have generated important transformations on all the six dimensions analyzed. In spite of that, IIO managed to sustain a sui generis role within this environment, being able to maintain itself as an important teaching and research facility at a national and international scale.

6.2 Limitations, further research tasks and contributions

The significant limitations of the present study remain on the fact that it focuses mainly on knowledge collection when searching for the what and how of the matter, where there was no space given to more knowledge construction and the search for the why. Consequently, other gaps are opened for future research in deepening on the mentioned factors of change and pursuing to explain patterns and factors that lead to these organizational changes.

Another limitation was to not have been able to locate and communicate with one of the former IIO Directors since he was part of the co-government period (1977-1989), this would be one important addition for further research in order to take into account his views during this critical time in UABC and IIO.

It would also be an important recommendation to add another dimension not reviewed in the present study, which was the case of international relations. A dimension that has always been of high importance for the institute, the organizational changes caused by these international relations over the course of these periods of time would be valued.
Furthermore, an important contribution is related to the focus on academic unit rather than the university itself, meaning that the majority of studies that have been done regarding organizational change are concentrated on an institutional level of HEI, when also the particular case of the IIO supports an interest case since it is an academic unit that was almost created with the university itself (3 years after UABC originates). In the same manner the change analysis done through the six dimensions and six periods, defined through the PDI and then related to the typology of change of neo-institutionalism and resource dependency. It may result as a tool for more specific or ample analysis for future studies, an example of this would be to deepen in only one of the dimensions or possibly add other dimensions not contemplated in the present study.

Additionally, the contributions given through this study can be reflected by the use of the information produced as an example for other academic units in UABC or any other Mexican public university. Even more so, with the tendencies of HEI that focuses on strategic planning and Institutional Development Plans which are finally being taken into account as a necessary instrument of institutional decision making.

Moreover considering the tendencies in governmental policies in México, that generate teaching and research complementary or common areas, one recommended policy that may be stated from this study is how UABC can develop an internal analysis regarding organizational changes that have been generated in recent years, more specifically from the 1980s up to today, with the ends of defining the sustainability of a possible departmental organization of the university. This is a subject that has been proposed by several authors in regards UABC, such was the case of Mungaray (2004) when he developed forecasts for the university in 20 years time. Based on size and dispersion of UABC, considering it ongoing growth, for the optimization of human and financial resources, taking into account that UABC attends to 53,210 students in 46 different academic units that are distributed in three main campuses in which each one has its own extension:

- Mexicali campus: San Felipe and Zona Valle extension.
- Tijuana campus: Tecate and Valle de las Palmas extension.
- Ensenada campus: San Quintin extension.

Also, during the development of this study a great interdependency was observed between two academic units, FCM and IIO, hence for future studies regarding organizational change in IIO it would be recommended to extend the analysis in order to contemplate the two units. In the same
manner, during the last years and while IIO developed postgraduate programs, its relation to other academic units of UABC as well as other research centers such as CICESE have been increasing. Due to this fact, it might be interesting to develop a summative or comparative study with them. This in many ways, obeys an observed tendency in government policy change towards the creation of teaching and research networks for shared knowledge areas, which at the same time concurs with Mungaray’s proposal of departmental structures as a need for human and financial resource optimization.

For the particular case of IIO, as a pioneer institution in these mentioned areas it will provide a concentrated descriptive account of their past history, while taking into account specific factors (e.g. their context, levels of autonomy, individuals personal opinions and perceptions) that were not analyzes in such a particular manner before. Furthermore, it provides a solid basis for IIO for their future strategic institutional plans and forecasts.
7 REFERENCES


APPENDIX 1. INTERVIEW GUIDE.

Questionnaire for eight in-depth interviews and one computer assisted interview with the Director, former Directors and other individuals involved in the organizational change incurred, during different periods of time, in the Oceanographic Research Institute from the Autonomous State University in Baja California, México.

Joint Master Degree: in the Higher Education European Masters Program from the University of Oslo (Norway), University of Tampere (Finland) and the University of Aveiro (Portugal).

Thesis Title:
Organizational change in an academic unit of a Mexican state university: the case of the Oceanographic Research Institute.

Interview conducted by: María de Lourdes Ballesteros García.

Beforehand I guarantee total discretion regarding the answers given during the present interview, since the information will be managed in a form that the main sources are not stated.

The thesis will focus on a historical analysis of the organizational changes that have been observed in the IIO, from two main theoretical perspectives: neo-institutionalism and the resource dependency theories. The neo-institutionalism theory is in accordance with the changes caused by a "free will" that the institution may possess, in the case the university or academic unit, we may consider it to be as part of the degree of autonomy that they might have. On the other hand the resource dependency perspective suggests that the changes incurred in an institution are commonly caused by higher level policies and external pressures upon which the institution depends on for its own resource needs, these two perspectives where examined by Åse Gornitzka in her article "Governmental policies and organizational change in higher education".

The questions asked during the present interview are in regards to the period where you where Director of the Oceanographic Research Institute in from the Autonomous State University of Baja California.

1. What was the period in which you where Director of the IIO?

2. Do you consider, that during this period, the IIO had, true and full, autonomy in the particular area of teaching and research? Yes ___ No ___ Why?

3. Where there resources that where obtained by the IIO on its own ? and did the use of those resources where somehow limited by UABC or another instance?
4. Was there any sort of conditioning in regards to reception of resources related to particular research subjects?

5. Taking into account the *Humboldtian* philosophy where solitude and freedom, autonomy from the state and the search of knowledge for its own sake are of main importance (including basic research). Was this principle applied in IIO?

6. On the topic of how researchers have had to become their own "research managers" (e.g. managing research budgets, generating reports, special requirements for particular research or acquisitions, to name a few). Did it happen in IIO during your period of time? and was it complicated to achieve?

7. Are there any alternatives that may be applied to ease the budgeting process for researchers?

8. How much do you consider that have researchers gained or lost because of the Researchers National System (SNI)?

9. What is your view of the famous international phrase of "publish or perish"?

10. What where the main problems that you had when it came to budget management? When budgets where authorized late in the year? and if, at the same time, did you have a limit of time for spending?

11. Did the IIO loose resources or part of the established budget because of what is stated in the last question?

12. Taking into account any policy change from the Secretariat of Public Education (SEP), Mexico’s National Council for Science and Technology (CONACYT) or from any other government organization: Where there changes in teaching and research policies that affected the IIO?

13. If policy changes did occur, did they affect the organizational structure of UABC and therefore IIO?
14. Furthermore do you consider that any of the changes, stated from the previous 2 questions, affected in any way the institutions (UABC or IIO) autonomy?

15. What do you consider where the main side effects for IIO, resulting from the creation of the Center for Scientific Research and Higher Education (CICESE) as a CONACYT Center?

16. Additionally, did the creation of CONACYT Centers in the rest of the country affect in any way IIO? if so, how did it affect?

17. Where there any organizational changes that where conducted as a result of institutional policies (e.g. in communication, optimum use of resources, creation of new instances for planning.).

18. Where there any researchers, that individually or as groups, have served as advisors for the creation of laws and policies at a local, state or national level?

19. What where the policies for "punishment or reward" employed for acquiring programs that where accredited by SEP, CONACYT or any other instance?

20. Do you consider that the Coordination for Institutional Planning is an important entity that serves as a governmental policy adapter for UABC or IIO?

21. Is there any other administrative entity within the UABC that you identify as a developer of internal organizational changes, derived from the needs or requirements from governmental policies or from another type of source.

22. During your period as Director of IIO, was there research networks from a national and international scale? if so, what where the benefits for IIO?
## APPENDIX 2 INTERVIEWEES

<table>
<thead>
<tr>
<th>PHOTOGRAPH</th>
<th>NAME</th>
<th>Period as Director of IIO</th>
<th>Interview Appointment</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="61x629" alt="Image" /> to 104x684</td>
<td>Ing. César Obregón M-Sanz Tel: 646 174-47-68</td>
<td>1960-1968</td>
<td>October 9 at 5 p.m. at his house.</td>
</tr>
<tr>
<td><img src="106x629" alt="Image" /> to 158x944</td>
<td>Oc. Amelia Chávez Comparán Oc. Alfredo Chee Barragán (Katusuo Nishikawa Kinomura†) <a href="mailto:ameliachavez@gmail.com">ameliachavez@gmail.com</a> <a href="mailto:achee@uabc.edu.mx">achee@uabc.edu.mx</a></td>
<td>1968-1973</td>
<td>Amelia October 1 at 4 p.m. at her house Alfredo He answers by e-mail, October 21.</td>
</tr>
<tr>
<td><img src="60x565" alt="Image" /> to 115x626</td>
<td>M.C. Ma. Guadalupe García y Lepe <a href="mailto:garlep@undl.edu.mx">garlep@undl.edu.mx</a></td>
<td>Director of FCM 1982-1992. Researcher IIO 1972-2009 Student FCM 1968-1972 Vice Rector Campus Ensenada UABC 2002-2006</td>
<td>September 24 at 7 p.m. at her house.</td>
</tr>
<tr>
<td><img src="117x565" alt="Image" /> to 162x617</td>
<td>Román Lizárraga Arciniega Ph. D. <a href="mailto:jroman@uabc.edu.mx">jroman@uabc.edu.mx</a></td>
<td>1981-1987</td>
<td>October 5 at 4 p.m. at the Taza Café</td>
</tr>
<tr>
<td><img src="84x505" alt="Image" /> to 137x563</td>
<td>M.C. Luis Galindo Bect <a href="mailto:lugabe2010@hotmail.com">lugabe2010@hotmail.com</a> 646 163-10-24</td>
<td>1987-1993</td>
<td>October 5 at 5 p.m. at the Taza Café</td>
</tr>
<tr>
<td><img src="81x439" alt="Image" /> to 139x503</td>
<td>Efraín Gutiérrez Galindo Ph. D. <a href="mailto:efrain@uabc.edu.mx">efrain@uabc.edu.mx</a></td>
<td>1993-2001</td>
<td>October 3 at 11 a.m. in his office at the IIO</td>
</tr>
<tr>
<td><img src="82x369" alt="Image" /> to 139x431</td>
<td>José Antonio Zertuche González Ph. D. <a href="mailto:zertuche@uabc.edu.mx">zertuche@uabc.edu.mx</a></td>
<td>2001-2005</td>
<td>October 3 at 1 p.m. in his office at the IIO</td>
</tr>
<tr>
<td><img src="82x309" alt="Image" /> to 138x366</td>
<td>Isai Pachico Ruíz Ph. D. <a href="mailto:isai@uabc.edu.mx">isai@uabc.edu.mx</a></td>
<td>2005-2012</td>
<td>October 2 at 4:30 p.m. in his office at the IIO</td>
</tr>
</tbody>
</table>
APPENDIX 3. CONSENT FORM FOR THE USE OF NAME AND PHOTOGRAPH FROM THE INTERVIEWEE.

**Title of the thesis:** Organizational change in an academic unit of a Mexican state university: the case of the Oceanographic Research Institute.

**Main objective:** The purpose of the present study is to analyze the organizational changes observed during a certain period of time in IIO. The interview questions are focused on the period where you held the position of IIO Director. Furthermore, to obtain valuable information of other periods you experienced within IIO and FCM as a student, teacher or researcher.

**Time required for interview:** from 50 to 80 minutes.

**Confidentiality:** Total discretion is guaranteed regarding the answers provided during the interview, since the information will be managed in a form that the main sources are not stated.

**Contact information:** María de Lourdes Ballesteros. Phone: (646) 196-8486. Address: Bahía Magdalena 233 Colonia Moderna, Ensenada, Baja California, Mexico.

Email: lballesteros@undl.edu.mx and lulub78@gmail.com.

**Agreement:** The present document is a petition to include your name and photograph in the present study for the specific purpose of giving validity to the information rendered during the interview.

Signature: __________________________________________ Date: ____________________

Name: ____________________________________________________________
APPENDIX 3. CONSENT FORM FOR THE USE OF NAME AND PHOTOGRAPH FROM THE INTERVIEWEE.

Title of the thesis: Organizational change in an academic unit of a Mexican state university: the case of the Oceanographic Research Institute.

Main objective: The purpose of the present study is to analyze the organizational changes observed during a certain period of time in IIO. The interview questions are focused on the period where you held the position of IIO Director. Furthermore, to obtain valuable information of other periods you experienced within IIO and FCM as a student, teacher or researcher.

Time required for interview: from 50 to 80 minutes.

Confidentiality: Total discretion is guaranteed regarding the answers provided during the interview, since the information will be managed in a form that the main sources are not stated.

Contact information: María de Lourdes Ballesteros. Phone: (646) 196-8486. Address: Bahía Magdalena 233 Colonia Moderna, Ensenada, Baja California, Mexico.

Email: lballesteros@unld.edu.mx and lulub78@gmail.com.

Agreement: The present document is a petition to include your name and photograph in the present study for the specific purpose of giving validity to the information rendered during the interview.

Signature: [Signature] Date: 22/Nov/2012

Name: José Antonio Bertche González
APPENDIX 3. CONSENT FORM FOR THE USE OF NAME AND PHOTOGRAPH FROM THE INTERVIEWEE.

Title of the thesis: Organizational change in an academic unit of a Mexican state university: the case of the Oceanographic Research Institute.

Main objective: The purpose of the present study and analyze the organizational changes observed during a certain period of time in IIO. The interview questions are focused on the period where you held the position of IIO Director. Furthermore, to obtain valuable information of the other periods you experienced within IIO and FCM as a student, teacher or researcher.

Time required for interview: from 50 to 80 minutes.

Confidentiality: Total discretion is guaranteed regarding the answers given during the present interview, since the information will be managed in a form that the main sources are not stated.

Contact information: Maria de Lourdes Ballesteros. Phone: (646) 196-8486. Address: Bahia Magdalena 233 Colonia Moderna, Ensenada, Baja California, Mexico.

Email: lballesteros@unl.edu.mx and lulub78@gmail.com.

Agreement: The present document is a petition to include your name and photograph in the present study for the specific purpose of giving validity to the information rendered during the interview.

Signature: [Signature]

Date: Nov 27, 2012

Name: Dr. Efrain Abraham Gutierrez Galindo
APPENDIX 3. CONSENT FORM FOR THE USE OF NAME AND PHOTOGRAPH FROM THE INTERVIEWEE.

Title of the thesis: Organizational change in an academic unit of a Mexican state university: the case of the Oceanographic Research Institute.

Main objective: The purpose of the present study is to analyze the organizational changes observed during a certain period of time in IIO. The interview questions are focused on the period where you held the position of IIO Director. Furthermore, to obtain valuable information of other periods you experienced within IIO and FCM as a student, teacher or researcher.

Time required for interview: from 50 to 80 minutes.

Confidentiality: Total discretion is guaranteed regarding the answers provided during the interview, since the information will be managed in a form that the main sources are not stated.

Contact information: Maria de Lourdes Ballesteros. Phone: (646) 196-8486. Address: Bahía Magdalena 233 Colonia Moderna, Ensenada, Baja California, Mexico.

Email: lballesteros@undl.edu.mx and lulub78@gmail.com.

Agreement: The present document is a petition to include your name and photograph in the present study for the specific purpose of giving validity to the information rendered during the interview.

Signature: ____________________________ Date: 22/11/2012

Name: Alfredo Chee Barragán
APPENDIX 3. CONSENT FORM FOR THE USE OF NAME AND PHOTOGRAPH FROM THE INTERVIEWEE.

Title of the thesis: Organizational change in an academic unit of a Mexican state university: the case of the Oceanographic Research Institute.

Main objective: The purpose of the present study is to analyze the organizational changes observed during a certain period of time in IIO. The interview questions are focused on the period where you held the position of IIO Director. Furthermore, to obtain valuable information of other periods you experienced within IIO and FCM as a student, teacher or researcher.

Time required for interview: from 50 to 80 minutes.

Confidentiality: Total discretion is guaranteed regarding the answers provided during the interview, since the information will be managed in a form that the main sources are not stated.

Contact information: María de Lourdes Ballesteros. Phone: (646) 196-8486. Address: Bahía Magdalena 233 Colonia Moderna, Ensenada, Baja California, Mexico.

Email: lballesteros@undl.edu.mx and luluh78@gmail.com.

Agreement: The present document is a petition to include your name and photograph in the present study for the specific purpose of giving validity to the information rendered during the interview.

Signature: [Signature]  Date: 25/11/2012

Name: América Chávez

94
APPENDIX 3. CONSENT FORM FOR THE USE OF NAME AND PHOTOGRAPH FROM THE INTERVIEWEE.

Title of the thesis: Organizational change in an academic unit of a Mexican state university: the case of the Oceanographic Research Institute.

Main objective: The purpose of the present study is to analyze the organizational changes observed during a certain period of time in IIO. The interview questions are focused on the period where you held the position of IIO Director. Furthermore, to obtain valuable information of other periods you experienced within IIO and FCM as a student, teacher or researcher.

Time required for interview: from 50 to 80 minutes.

Confidentiality: Total discretion is guaranteed regarding the answers provided during the interview, since the information will be managed in a form that the main sources are not stated.

Contact information: María de Lourdes Ballesteros. Phone: (646) 196-8486. Address: Bahía Magdalena 233 Colonia Moderna, Ensenada, Baja California, Mexico.

Email: lballesteros@unl.edu.mx and lulub78@gmail.com.

Agreement: The present document is a petition to include your name and photograph in the present study for the specific purpose of giving validity to the information rendered during the interview.

Signature: __________________________ Date: 26/11/2012

Name: María Guadalupe García y llole
APPENDIX 3. CONSENT FORM FOR THE USE OF NAME AND PHOTOGRAPH FROM THE INTERVIEWEE.

Title of the thesis: Organizational change in an academic unit of a Mexican state university: the case of the Oceanographic Research Institute.

Main objective: The purpose of the present study is to analyze the organizational changes observed during a certain period of time in IIO. The interview questions are focused on the period where you held the position of IIO Director. Furthermore, to obtain valuable information of other periods you experienced within IIO and FCM as a student, teacher or researcher.

Time required for interview: from 50 to 80 minutes.

Confidentiality: Total discretion is guaranteed regarding the answers provided during the interview, since the information will be managed in a form that the main sources are not stated.

Contact information: Maria de Lourdes Ballesteros. Phone: (646) 196-8486. Address: Bahía Magdalena 233 Colonia Moderna, Ensenada, Baja California, Mexico.

Email: lballesteros@undl.edu.mx and lulub78@gmail.com.

Agreement: The present document is a petition to include your name and photograph in the present study for the specific purpose of giving validity to the information rendered during the interview.

Signature: [Signature]
Date: [22/11/2012]

Name: [Dr. Tsai Pacheco Ruiz]
APPENDIX 3. CONSENT FORM FOR THE USE OF NAME AND PHOTOGRAPH FROM THE INTERVIEWEE.

Title of the thesis: Organizational change in an academic unit of a Mexican state university: the case of the Oceanographic Research Institute.

Main objective: The purpose of the present study is to analyze the organizational changes observed during a certain period of time in IIO. The interview questions are focused on the period where you held the position of IIO Director. Furthermore, to obtain valuable information of other periods you experienced within IIO and FCM as a student, teacher or researcher.

Time required for interview: from 50 to 80 minutes.

Confidentiality: Total discretion is guaranteed regarding the answers provided during the interview, since the information will be managed in a form that the main sources are not stated.

Contact information: María de Lourdes Ballesteros. Phone: (646) 196-8486. Address: Bahía Magdalena 233 Colonia Moderna, Ensenada, Baja California, Mexico.

Email: lballesteros@undl.edu.mx and lulub78@gmail.com.

Agreement: The present document is a petition to include your name and photograph in the present study for the specific purpose of giving validity to the information rendered during the interview.

Signature: [signature] Date: 25 de Nov. 2012

Name: [signature]
APPENDIX 3. CONSENT FORM FOR THE USE OF NAME AND PHOTOGRAPH FROM THE INTERVIEWEE.

Title of the thesis: Organizational change in an academic unit of a Mexican state university: the case of the Oceanographic Research Institute.

Main objective: The purpose of the present study is to analyze the organizational changes observed during a certain period of time in IIO. The interview questions are focused on the period where you held the position of IIO Director. Furthermore, to obtain valuable information of other periods you experienced within IIO and FCM as a student, teacher or researcher.

Time required for interview: from 50 to 80 minutes.

Confidentiality: Total discretion is guaranteed regarding the answers provided during the interview, since the information will be managed in a form that the main sources are not stated.

Contact information: María de Lourdes Ballesteros. Phone: (646) 196-8486. Address: Bahía Magdalena 233 Colonia Moderna, Ensenada, Baja California, Mexico.

Email: iballesteros@undi.edu.mx and lulub78@gmail.com.

Agreement: The present document is a petition to include your name and photograph in the present study for the specific purpose of giving validity to the information rendered during the interview.

Signature:  
Date: 22/Nov/2012

Name: Román Lizárraga

98
APPENDIX 3. CONSENT FORM FOR THE USE OF NAME AND PHOTOGRAPH FROM THE INTERVIEWEE.

Title of the thesis: Organizational change in an academic unit of a Mexican state university: the case of the Oceanographic Research Institute.

Main objective: The purpose of the present study is to analyze the organizational changes observed during a certain period of time in IIO. The interview questions are focused on the period where you held the position of IIO Director. Furthermore, to obtain valuable information of other periods you experienced within IIO and FCM as a student, teacher or researcher.

Time required for interview: from 50 to 80 minutes.

Confidentiality: Total discretion is guaranteed regarding the answers provided during the interview, since the information will be managed in a form that the main sources are not stated.

Contact information: Maria de Lourdes Ballesteros. Phone: (646) 196-8486. Address: Bahia Magdalena 233 Colonia Moderna, Ensenada, Baja California, Mexico.

Email: lballesteros@undl.edu.mx and lalub78@gmail.com.

Agreement: The present document is a petition to include your name and photograph in the present study for the specific purpose of giving validity to the information rendered during the interview.

Signature: Date: 29/11/12

Name: Luis Armando Galindo Bect