Migrating from Management Information System (MIS) to Executive Information System (EIS). The information systems change for creating strategic value in an academic institute.

Evangelos Ergen, ergen@ergen.gr
http://www.ergen.gr
Issue date: 31 August 2011

Abstract: The emergence of entrepreneurial-oriented academic institutes is the next challenge for the education itself. The velocity of technological changes in combination with the complex and uncertain situations, in global terms, implies the adoption of information systems that will not only focus in organisational problem solving, but in creating value for an academic institute and enriching the study experience for the student. In an environment of no boundaries both from academic and professional perspective, flexibility and scenario planning may be considered as means to cope with future challenges. Since an information system images the organisation's structure, its patterns of work, the business processes and the people's mentality, it is a crucial and necessary tool to guarantee the successful transformation of the institute.

This paper focuses in the admissions process of an information system in an academic institute of tertiary education. It analyses this process and brings forward the weaknesses derived from the current information system evaluating the organisational impact to other departments. Moreover, it performs a diagnosis on it and evaluates the use of information at present situation. Also it makes a systematic approach on how it works and recommends improvements in order to increase its effectiveness. This is mostly an empirical study since it retrieves data from a real case. It is identified that the admissions process at its current state, does not provide adequate accessibility and share of knowledge to other departments while the reporting from the central administration office, which manages the information system, is considered rather poor. As a result there are communication problems and lack of effective cooperation which in continuous restrain any further development. Based on that series of problems, there is a certain scenario of intervention which is recommended and this is based in the knowledge infrastructure. The knowledge infrastructure of the institute defines how the knowledge is diffused and the level this can be used effectively. The flow of information and how this is exploited actually reflects the organisational development. Thus, if the infrastructure changes, it is expected that the problems can be confronted and the institute will experience a new model of administering the information. The change recommended is the introduction of a "business intelligence unit (biu)" which will undertake the responsibility to administer the information system and decide whether to centralize or decentralize the flow of information based on what is simple information, or extensive knowledge or even evaluated wisdom for each department. There is an innovative approach in this model, since it adopts supply chain practices from the logistics side mostly in terms of identifying which is the pathway of information and how this "travels" among the involved parts. Literature review is accommodated in this paper for the synthesis of the ideas. This model is expected to add value in the service of "education experience" and help the institute in its alignment to the entrepreneurial spirit. The difference between a management information system and an executive information system is the borderline of wisdom existence when high-level educators-managers are ready to take decisions and they expect certain things from their information system. Finally, this paper examines the information systems change purely from the administrative perspective of the academic institute and does not involve any academic issues. On the contrary, it introduces a change in the organisation's structure which is expected to affect the information systems since it will reshape the knowledge infrastructure of the institute.

Keywords: information system change, knowledge infrastructure, admissions process, sophisticated reporting

1. INTRODUCTION

According to *Robbins-Gioia survey (2001),* there is a 46% of employees who did not feel that their organisation knows how to use an information system, in order to improve its business. In the same survey it was revealed a 51% of employees who did not see the use of an information system as a successful investment. Similar studies *(Conference Board Survey, 2001; Willcocks, 1994),* have demonstrated that projects in information systems and their adoption in the work area, have a high failure-rate plus they appear to exceed projected budget in the end.

The adoption of information systems in the education administration had a direct impact both in coordination and control of the information. In this way, the institutes were capable of introducing changes, make improvements and design processes that contributed in better organising their administrative work.

This paper intends to describe the admissions process in an academic institute of tertiary education, in Greece. The institute is technology oriented and applies innovative practices in the administration. The organisation uses an information system which is customised and self-dependent. This system operates for 10 years and is an integrated application based on relational databases which interact with specialised applications in order to process the data and provide adequate reporting to the departments of the institute. Below is given the interaction ecomap of the academic institute's information system, which represents the system from the communicative side. This is the complete image of the departments that are participating and the centralisation of information.

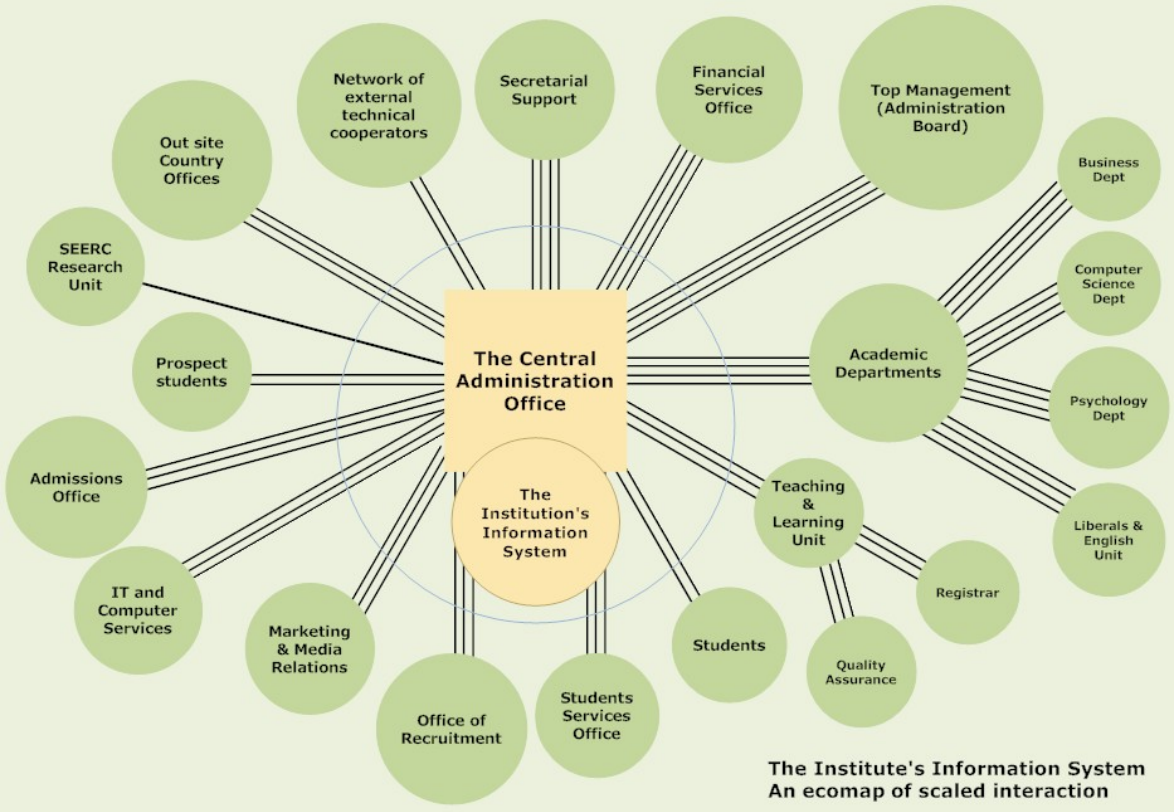


Figure 1. The Institute's Information System (Ecomap of interaction)

The difference in the connecting lines between the departments/entities and the central administration office, shows how often the communication is. The information system is based on a centralised flow of information and is administered by the central administration office. In this environment, there is an attempt to examine a process which is part of the whole system and this is the admission process. This process affects a number of departments in the institute, while in parallel incorporates activities that are interdepartmental. In addition, the admission process is the entry point of the student to the institute's information community.

More specific, the admission process is the procedure where a candidate student submits the application to register in the University to attend a course. This is the standard procedure followed on global basis by academic institutes and here it is examined the level of credentials of the candidate in order to accept or reject the application.

The next diagram intends to illustrate this activity (*Admissions Process Workflow*). It represents the flow of information and the entities which participate in the admissions process.

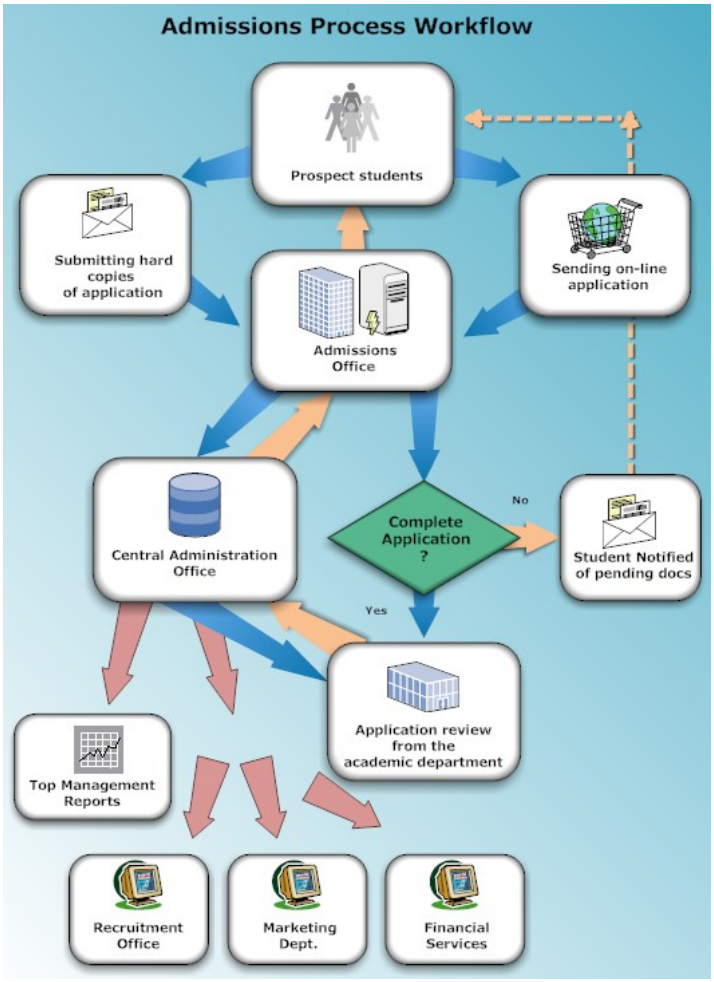


Figure 2. The Admissions Process Workflow

The participating entities are:

(a) the prospect students
(b) the Admissions Office
(c) the Central Administration Office
(d) the Academic Departments
(e) the Recruitment Office
(f) the Marketing Department
(g) the Financial Services
(h) the Top Management

The above entities are divided into two groups. The first group includes the ones that have direct involvement in the process and these are: (a) the prospect student, (b) the Admissions Office, (c) the Central Administration Office, and (d) the Academic Departments.

The rest four entities have an indirect involvement, as they receive information on admissions through reporting and they are not engaged in the run of the process itself. The Central Administration Office, administers the information system of the institute, and as shown, the information is filtered and distributed through it. It plays a significant role in the diffusion of information and keeps control of the procedures. Marketing and Recruitment Offices have definite

needs in getting reports that comply with their requests and are in alignment with their plans. Thus, both are demanding due to the nature of their tasks. Therefore, the requests for more qualitative reporting are of top priority for the Central Administration Office.

The next diagram, intents to illustrate the categorisation of sub-processes in the admissions process workflow. There are three main steps: (a) data entry, (b) data process, and (c) data reporting, which constitute the backbone of this process. This is mostly a technical illustration of how the process works in its low-level operation.

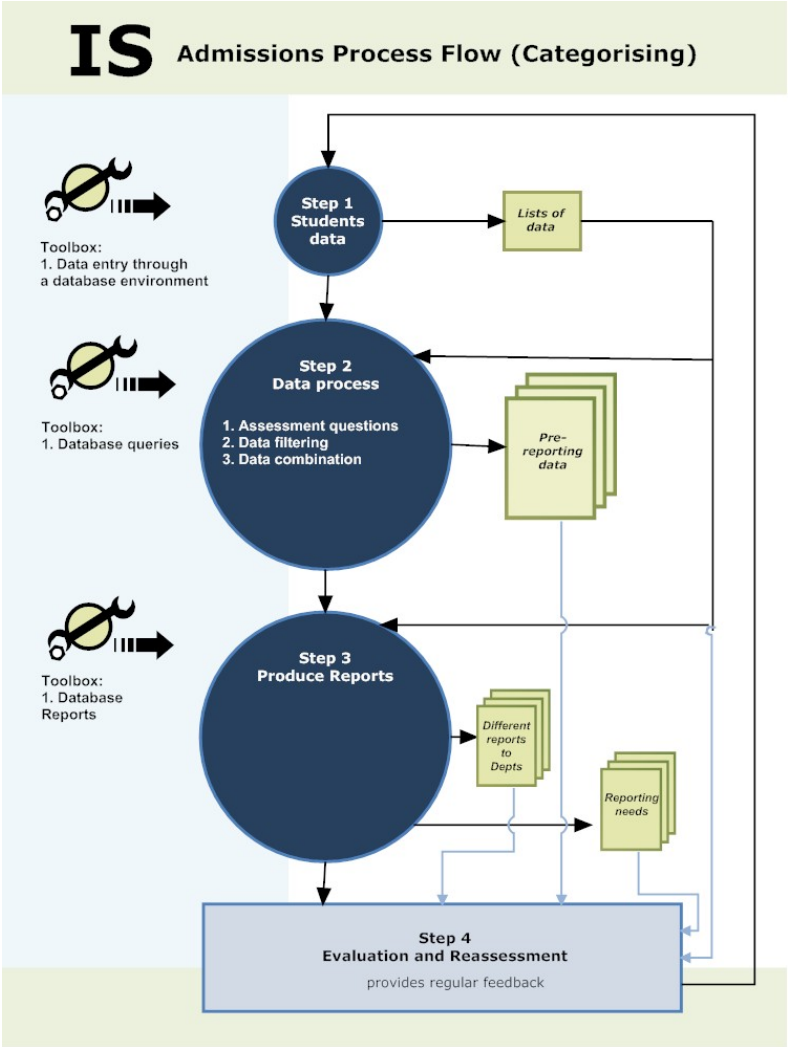


Figure 3. The Admissions Process flow (categorisation of sub-processes)

Currently the admissions process experiences centralisation both in flow of information and in administration. This creates conflicts and inefficiencies among the departments. Specifically the problems reported are the following:

- There is hidden information which is not revealed on time (asynchronous momentum);
- There is knowledge that is not shared although the processed information is available;
- It seems that there is lack of sophisticated reporting which could contribute to the decision making;
- Sometimes there is lack in coordination ref plans of action interdepartmentally;

The problems are registered among the Marketing and Recruitment Offices and the Central Administration Office. Moreover, it was identified that the reporting to top management have reached a certain level and need to be re-engineered in order to help more in the decision making strategic issues.

2. Diagnosis

The admissions process could be considered as an interconnected activity among the offices. The data administered by the central administration office are of great interest and concern for all of them; therefore it is necessary to perform a systemic diagnosis trying to reveal interconnections of problems and impact between these elements.

2.1 The Organisational Context

The flow of information and how the information system currently operates reflects the organisation's structure and hierarchy. Below is given a part of the organisation chart which includes the offices that are affected by the admissions process.

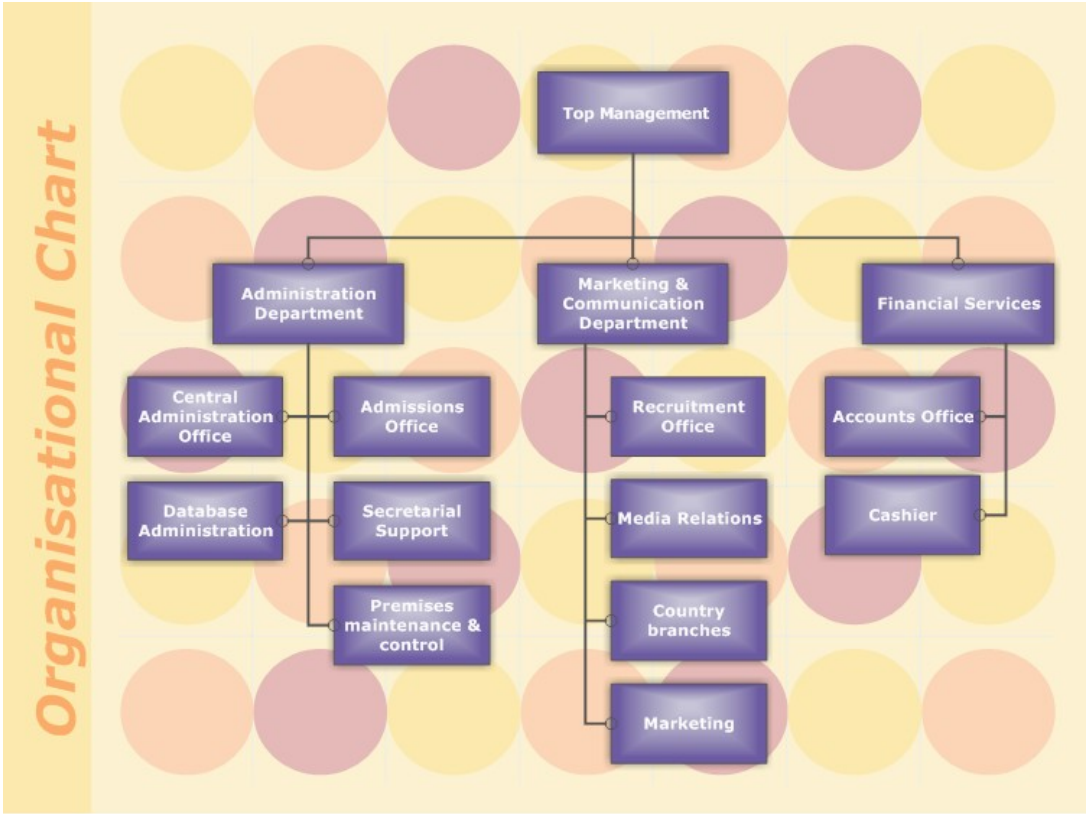


Figure 4. The Organisational Chart

The information system is embedded in the administration department. This by itself may be a weakness since it is affected by the department's specialties. The admissions office has a different approach and evaluation of students' data than the marketing department. Considering that a student may be treated as a customer, the marketing department expects to get more specialised information retrieved from students' data.

2.2 Identify the explicit and implicit problems

Further to the previous section we could identify some problems that arise from current structure of the organisation. There were a series of contacts between the central administration office and the offices involved with discussions on issues that are of concern in terms of the admissions process and how this could be improved. The most important move was the observations which were made following the management by wandering around technique. It was identified that both the recruitment and the marketing offices need to get more in depth knowledge derived from the information system but this was unavailable as they could not have direct access to the system and get the desired information on time.

There is a specialty though at this stage. The Marketing Office needs different kinds of reporting at different timing. Such reports may not remain the same in terms of structure but can be altered according to what the manager of the office would like to get. This, by itself needs a dedicated and customising approach which is currently unavailable due to the different structure of the Administration Department.

This creates communication burden and in result a non-positive attitude of employees about the system. Beyond that, there is a certain need for supporting the offices in their assumed goals. The Administration is expected to support the others through the use of the system. The admissions process could be considered as a model process for the whole information system, since it incorporates significant amount of resources.

The users feel restricted due to the narrow reporting which is currently available. On the other hand the process of the information generates knowledge among the users which is not imported in the system and remains unexploited. This is mostly because the administration cannot handle the bulk and the diversification of this information which is done continuously.

In the diagram below *(figure 5)* there is an attempt to illustrate the reporting sub-process as this is supported by the administration. It describes current reporting from the central database to the five most involved entities-offices in the admissions process.

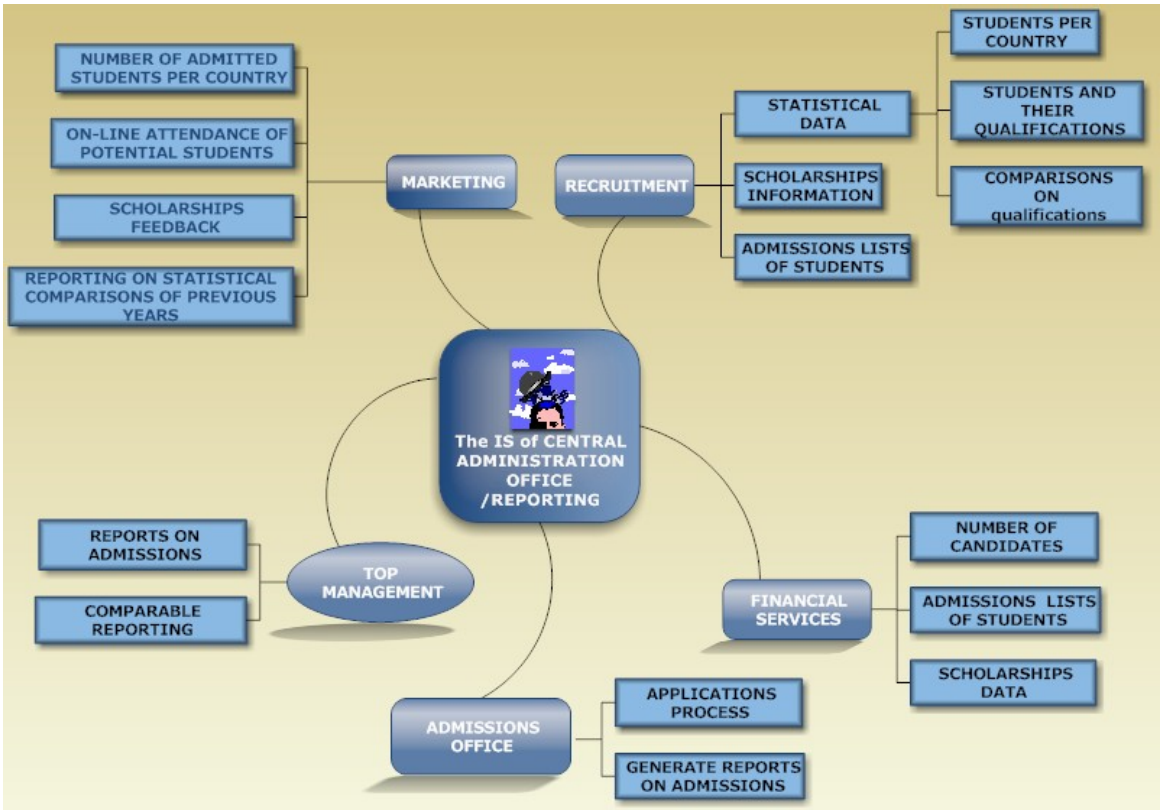


Figure 5. The Reporting flow

The existed system restrains possible creativity and shapes behaviours which do not support an added-value attitude. The problematic situation is that the knowledge is entrapped and it is infused in an asynchronous way depending on how administration can react and support the other offices. This affects the internal norms of cooperation and the human interaction. Information has controlling function in a company; therefore, according to the path that follows it expands or restricts any other operations.

In addition the employees' behaviour is affected as there are arguments of how the information should be administered between the marketing office and financial services office. Sometimes there are conflicts which derive from information misleading and inadequacies in some reports. Each office has its own needs and targets but all of them operate under the institute's strategic

plan. Thus, the system should link and operate as a mediator in order to help the alignment with the plans of the top management.

The Central Administration Officer applied a number of observations in order to collect the inquiries and identify the symptoms and problems as described by the users. Nevertheless, the model of interaction with them was based in some parameters that were taken into account. The next diagram *(figure 6)* illustrates this action.

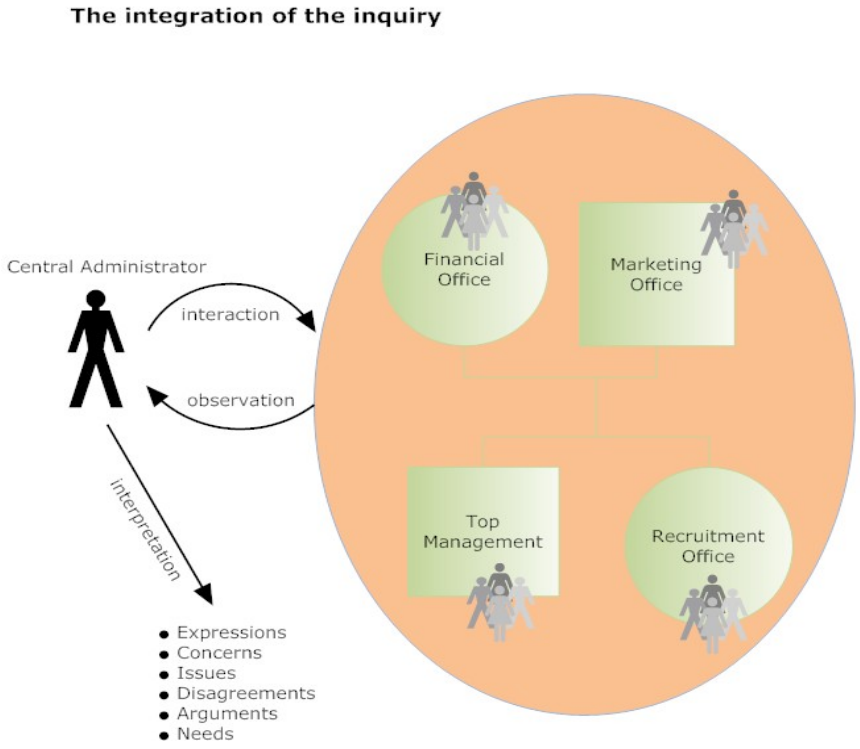


Figure 6. The integration of the inquiry

This technique helped in identifying and prioritising the problematic areas, which were focused in Marketing and Recruitment Offices.

2.3 Social, Political and Economic context

According to *Malmsjo and Ovelius (2003)*, there are both internal and external factors that induce changes in an information system. In the external factors are included: (a) the laws and regulations, the legal framework, (b) the culture and mentality of people, (c) the economic conditions and demands, and (d) the technology.

It is inevitable trying to develop a diagnosis without taking into consideration where the institute is placed and how this is affected by the environment. In result, the information system has to comply and respond in such an operating framework.

The environment experiences a number of transforms in terms of legal and economic situations. The country, where the institute is based, is facing reforms which create opportunities but implying flexibility and quick responses. Such situations spin the creative thinking and make people reconsider of think how they think *(Kawalek, 2011).*

The institute although based in Greece, has a broaden activity in South East Europe through a certain strategy which aspires to embed it as a leading organisation in the area. This strategic action needs an information system which is adequate and supportive enough to feed with valid and creative information the offices. This intensive activity of the organisation needs a system that should cover strategic moves and not only a rich-informative environment. To be the leader in your field you have to differentiate in all aspects, including the small daily processes. Being global and entrepreneurial-oriented means dedicating to go beyond the edge and switching from ordinary to special. As *Papageorgiou and Bruyn (2010)* claimed, an executive information system (EIS) can

incorporate the unmet needs of the users in order to add strategic value in the organisation. The mission of both Marketing and Recruitment Offices is identified as significant and of priority.

2.4 Development of Diagnosis (The rich picture)

The analysis of the admissions process, presented so far, and the attempt to make a diagnosis have directed to the picture of the system and its problematic areas. In the next diagram *(figure 7),* it is given the process and the reporting. Moreover, in the reporting space, which needs improvements there are highlighted the two areas that are problematic.

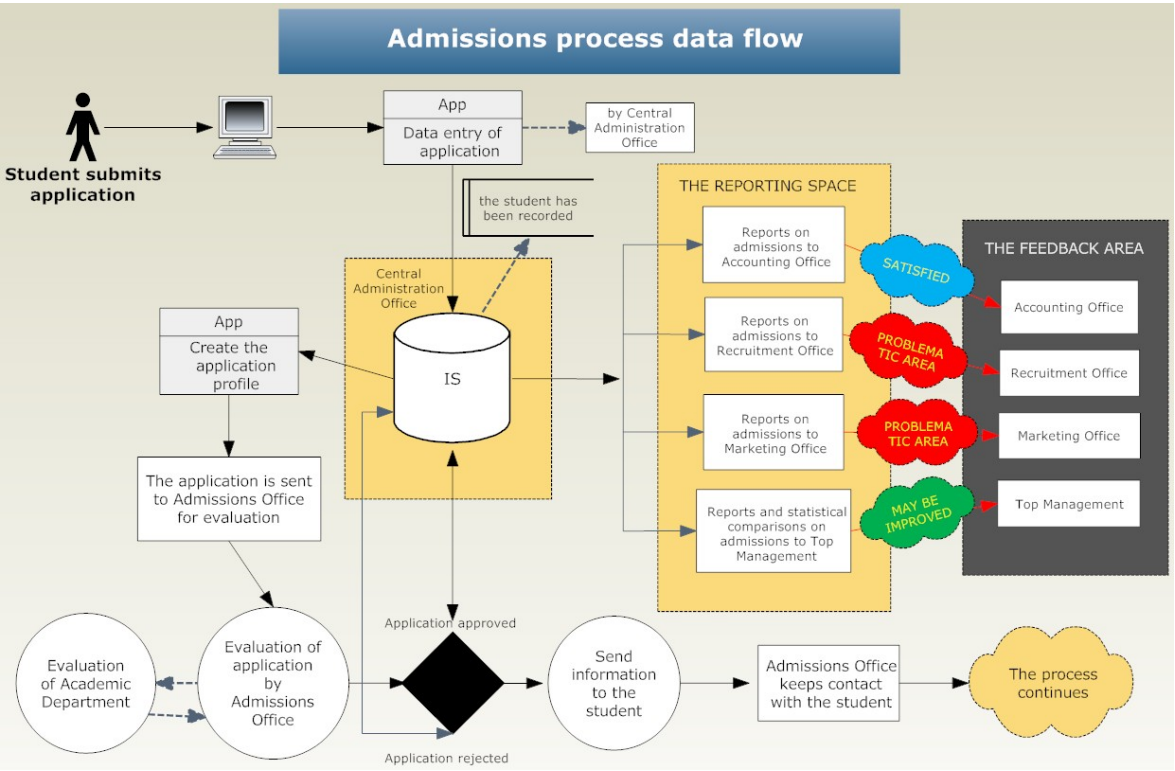


Figure 7. Admissions Process data flow (identifying the problematic areas)

Further to the previous illustration which tends to identify the process, the entities and the problematic areas, there is an effort to capture the rich picture. After collecting as much data as possible through observation and management by wandering around, it is necessary to picture the model *(figure 8).*

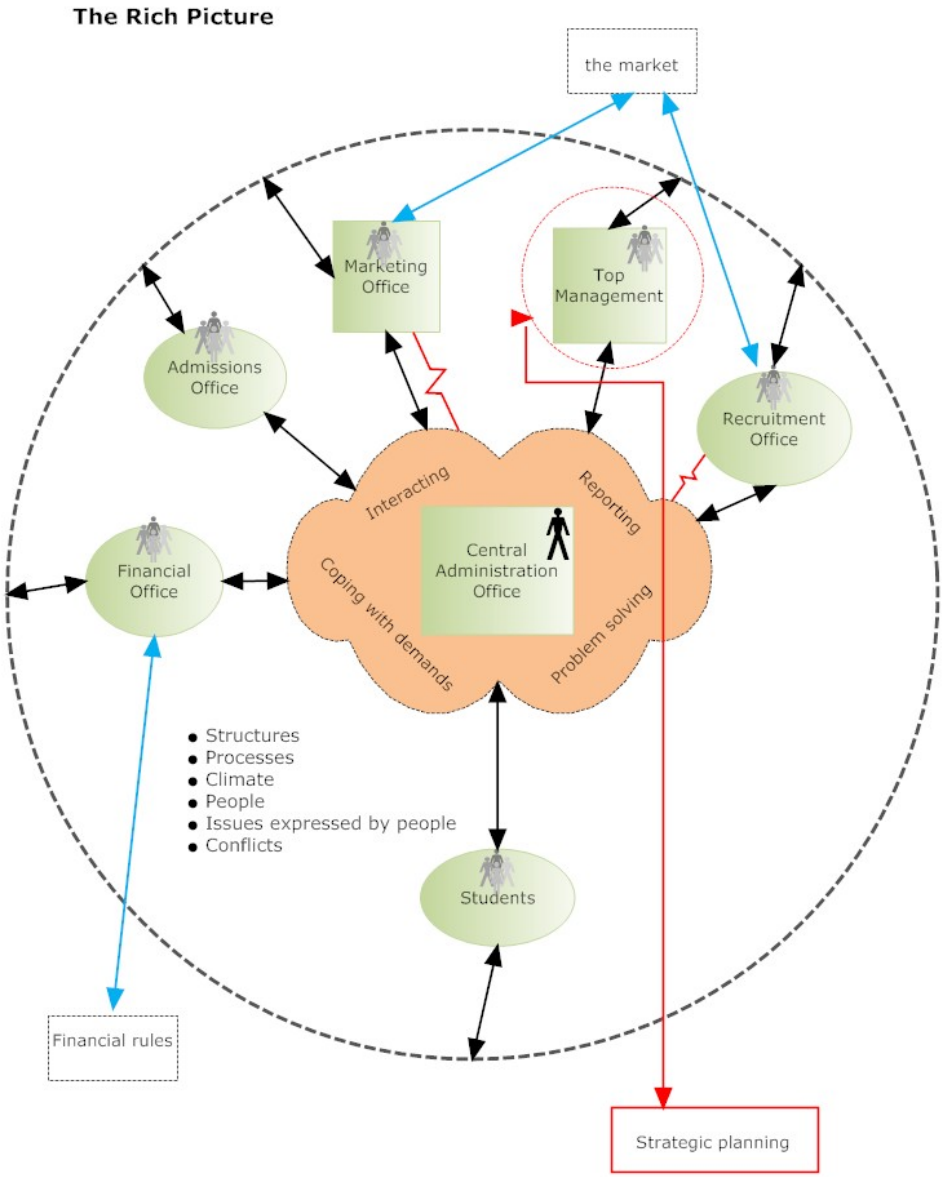


Figure 8. The Rich Picture

The rich picture intends to capture the diagnosis and represent it in a technical view. Nevertheless, this could not be done unless the diagram which is given later on *(figure 9).* This actually aggregates the basic thoughts and motives of the existed information system depending on what is the mission of administration. It is considered as the preliminary map upon the rich picture was based on.

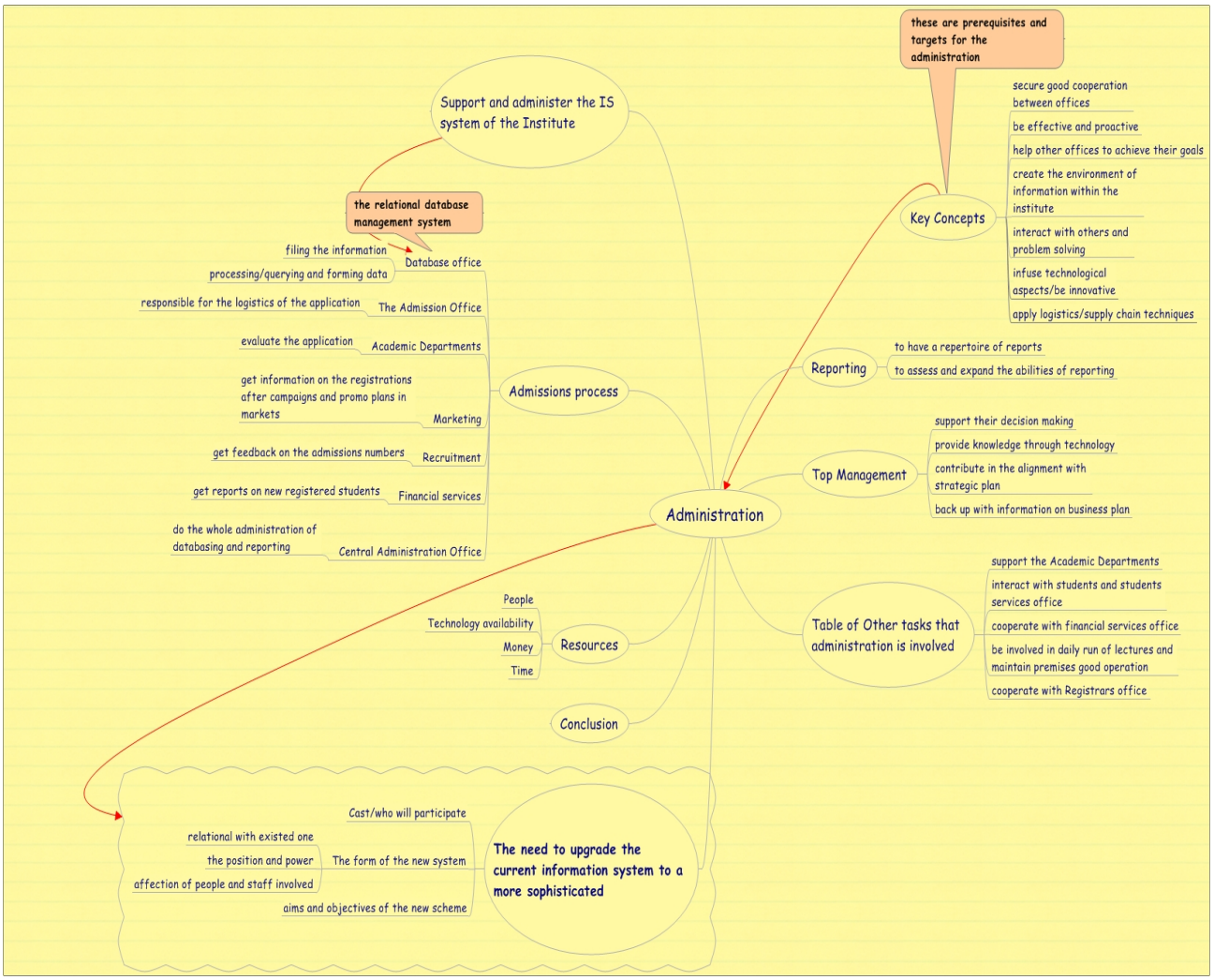


Figure 9. The Administration – Key concepts

3. The Process Modelling

According to *Checkland (2000),* to build a concept model of a complex purposeful activity for use, you require a clear definition of the purposeful activity to be modelled. At this situation, it may be a solution to apply mouldability as a constructive element. This could be done by a staff member, an expert (the central administration officer) who will adapt the system to the new demands. Nevertheless, the issue is not purely technical but involves a circle of changes in a framework of social process. Focus can be given not only in solving the present case but training the system in reacting on how to confront with problem situations (process thinking).

The nature of demands coming from the offices, directs the admissions process to a primary task process approach. It is significant to register what has to be done and not how this will be done, at first level *(Bienkowski, 1994).*

The administrative information and its degree of centralisation was always an issue for concern. It is worth to include an interesting diagram as presented by *Kawalek (1994)* which demonstrates the application type in terms of the degree of user orientation and control, within the context of the degree of centralisation. This can help in the decision, on how centralised or decentralised the institute would like the flow of information to be, thus which will be the proper infrastructure for the knowledge diffusion within the institute.

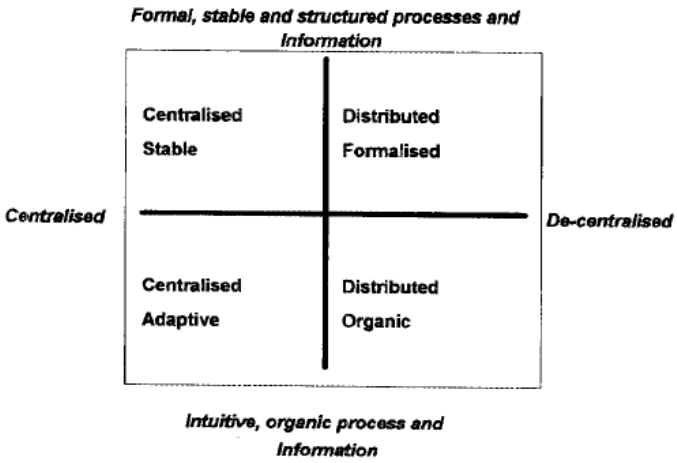


Figure 10. Adaptive vs formalised processes and data manipulation
(Source: Kawalek, J.P (1994) Interpreting business process re-engineering on organisation workflow. Journal of Information Technology, 9, pp. 276-287.)

In the next steps there will be an effort to model the existed processes in order to better analyse and understand them. Actually this is a description of an in-depth processing of the information following the simple steps of input-process-output. As mentioned earlier the information system of the institute is centralised as it tries to maintain a customised and independent administration of the information. This primarily maintains flexibility, adaptation and quick response to demands unless the human resource available is overburned.

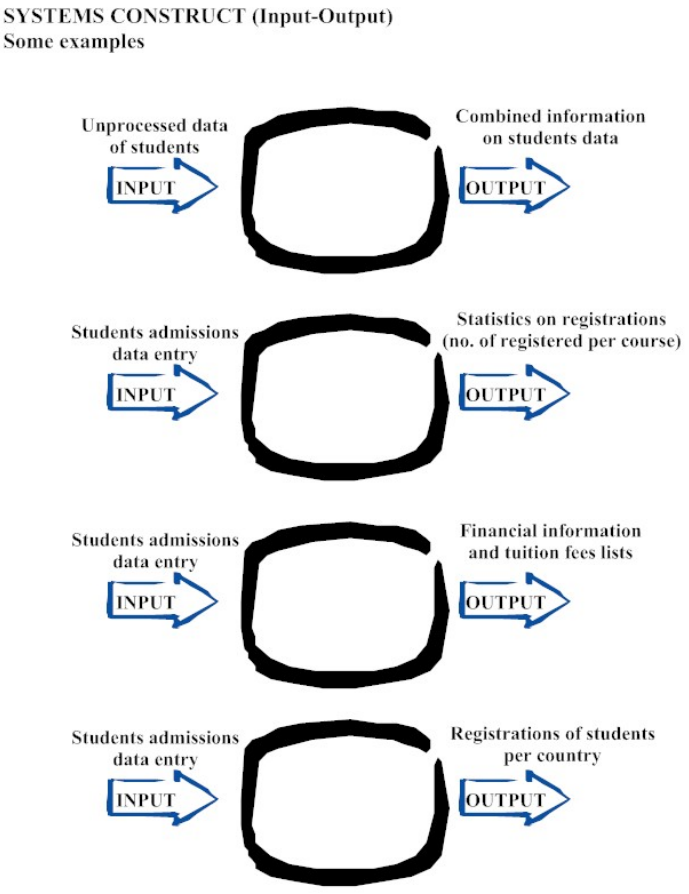


Figure 11. Systems Construct (Input-Output)

Nevertheless, there is still the step of transformation which edge between input and output. In the current system the job is done by the Central Administration Office, which has the responsibility of transforming the data and provides information and knowledge to the others. In a dynamic environment though, this relationship has to be adaptive and responsive both ways. The system reflects people and how they interact, as well as how they have organised their tasks. When the limits change the map has to change accordingly. Thus, the system needs to expand its boundaries and cover more demands and requests.

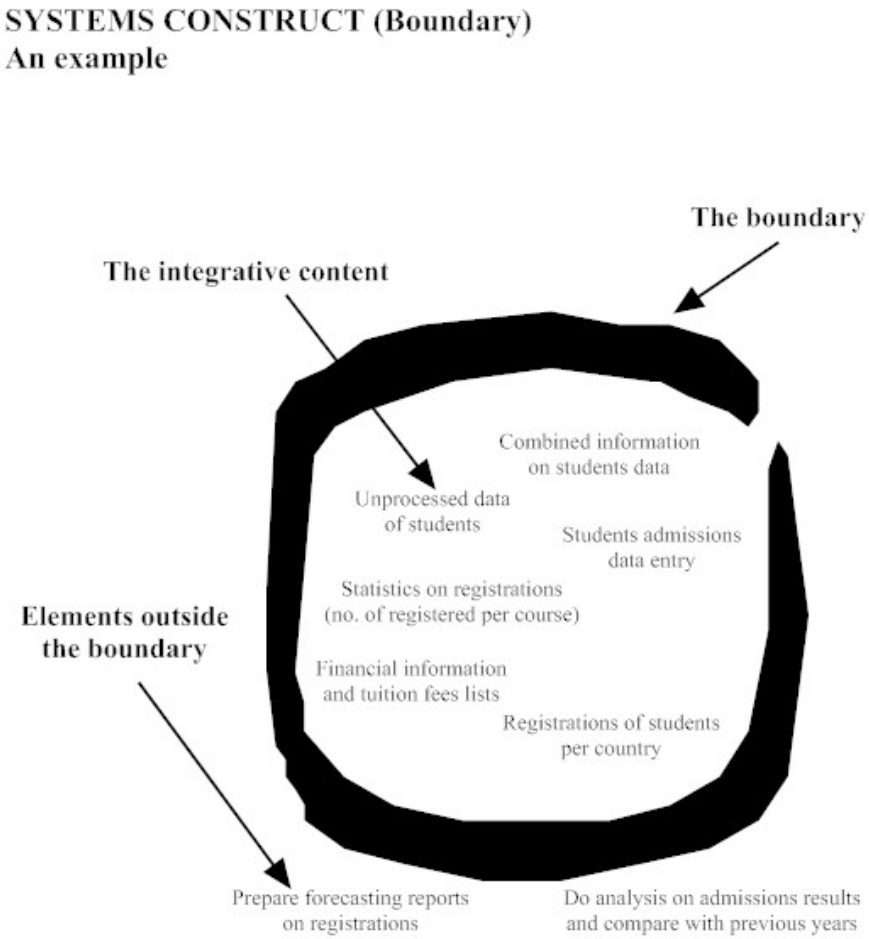


Figure 12. Systems Construct (Boundary)

In a dynamic environment there will be always elements outside the boundaries. The task of the information system is to incorporate but preferably to act proactively. So far, it is intended to illustrate in a manner the organisational process. The outlines of inputs and outputs are presented. In this way, it is possible to realise the status of each part of the system. By approaching this analysis from different perspectives it is expected to gain more knowledge about the information system identifying its weaknesses and nature.

In the next diagram *(figure 13)* it is presented the systems construct but with the presence of additional integrated elements which are there to affect the process. Their common characteristic is the human attribute. All elements are passing through human interaction and behaviour.

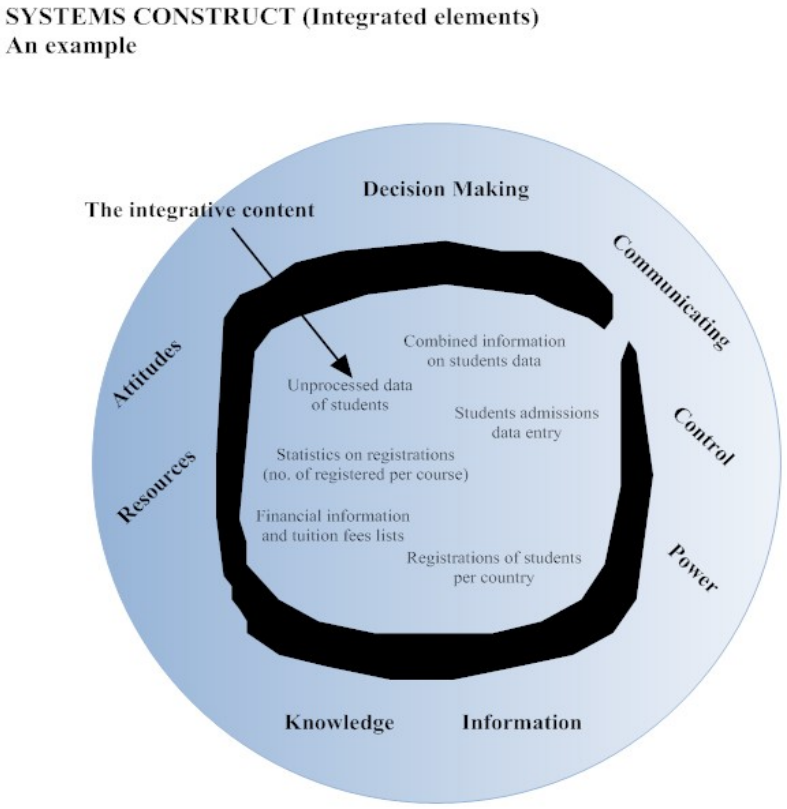


Figure 13. Systems Construct (Integrated Elements)

The system is suggested not to stick to the processes and replicate their existence. Except the rich picture there is a big picture which incorporates the plans and expectations of all offices and other colleagues who wait to experience the contribution of the information system. The system must display purposeful behaviour as well as the ability to change or modify the behaviour *(Kawalek, 2011)*. According to *Buckle (2003),* contemporary organisations are teleological purposive structures designed to fulfil societal needs. In the same study she acknowledged that reality is structured in profoundly systemic ways affected by human behaviour and organisation's needs. Moreover, at the bottom of this approach still remains knowledge.

4. Process modelling for information systems management II

The Central Administration Office among others has a mission to serve and support the administrative offices such the ones presented so far. The offices engaged at the admissions process could be considered as the client beneficiaries because (a) they get the results of the system's process and (b) they are the victims, in case the system does not provide them with the requested information. Moreover, any discrepancies and failures may direct to conflicts and inadequacies. Nevertheless, the Marketing, the Recruitment, the Accounting, the Admissions Office and the top management can be identified as the *multiple client beneficiaries*. Of course, there are additional groups but in indirect involvement and these are: the Academic Departments and the prospect students.

Further to this, trying to approach from the decision making perspective we could identify that the top management is involved to use the process in terms of doing the strategic decision making. For this reason they are concerned about ready-made predefined reports which can serve and give answers to strategic questions. On the other side the admissions office as well as the accounting office is operational decision makers. The rest, marketing and recruitment are obviously concerned to measure and to identify if the strategic options originally set by the top management are fulfilled in a manner, or there are issues to be raised and reconsidered. Therefore, their role is double. In the end, the central administration office, given the current organisation's structure, aggregates the information power and serves as the link between all offices and functions. Actually, it preserves

the principal to align the decisions with the purposefulness of the process and this is due to a given flexibility that exists and is sourced by the current structure as well.

Since, you cannot change a team that wins this is a constraint by itself. In a system, there will always be constraints that restrain hidden powers to reveal but nevertheless, it is an option to identify such powers in order to consider them in the future. Expected or unexpected changes can always be used for restructures and “upside-downs”. There is though a basic constrain identified and this is the current knowledge infrastructure. The organization performance is based on a certain skeleton and among others knowledge is an essential element in this skeleton. A flexible entity implies quick changes in its knowledge control and knowledge diffusion. If knowledge is not shared then this is a constraint.

The admissions process by itself is not mechanical, as the institute follows a full customization in treatment and administration on individual basis. Of course there are certain rules followed and there are prerequisites and principles, which follow a mechanical process but in overall the service provided is more than that. The policy is to avoid mechanic actions and evaluate each prospect student with the use of human intervention and not solely through the system. The system is used to support and contribute in providing information. Thus, the staff needs to have skills and use them. As a result the admissions process follows a systematic path but includes individual non-systemic parts. Probably, in order to cope with the requests from other offices, as described so far, the process could be more systematic internally. The adoption of more sophisticated tools and the transformation to a more client-oriented application *(where client-oriented: it is considered the multiple client beneficiaries presented earlier)* may be of consideration.

It is true that the system so far has presented a number of emerging outcomes. For example, based on the current infrastructure, it gives a number of compared reports, having to do with the past involvements of the prospects (previous jobs, internships, participation in events etc). This reporting can create an additional profile for the candidate. Nevertheless, currently this is not used in a broaden manner but in rare basis. This is due to knowledge infrastructure and the knowledge resources which are not adequate to support such sophisticated reporting, although the know-how exists. Obviously, there might be additional characteristics of such emergent outcomes but these are restrained.

Current structure has defined a specific hierarchy in terms of interrelations. In the diagram given below there is an attempt to illustrate the position of each entity (office) and present their close link and dependence.

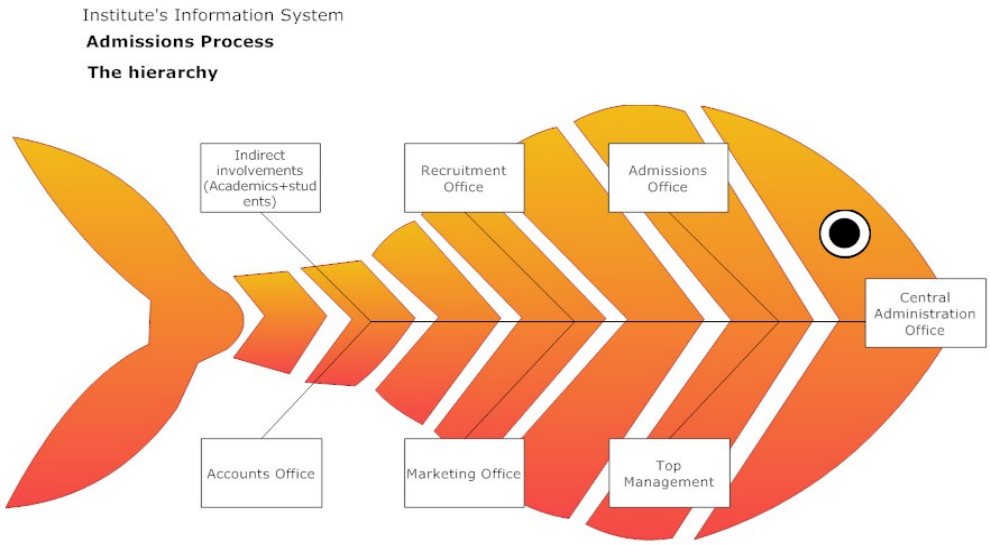


Figure 14. The Hierarchy

The analysis in this section could be useful, keeping in consideration that the primary task approach needs to identify all parts involved (offices), try to interpret their needs and requests, and focus on what has to be done, according to the demands.

5. Process modelling for information systems management III

The primary task process is the central idea of establishing a system and building the rest of infrastructure on it. As declared in earlier section, the main concern is to identify the tasks that have to be focused in order for the central administration office to comply with the requests.

It is challenging to represent the current admissions process through a Role Activity Diagram (RAD) as this may reveal the roles and activities as well as the ordering and interactions. According to *Badica and Badica (2003)*, the role activity diagram can be used for modelling the dynamics and role structure of an organisation. Below is given a brief preview of how such diagrams can be used and which is the code.

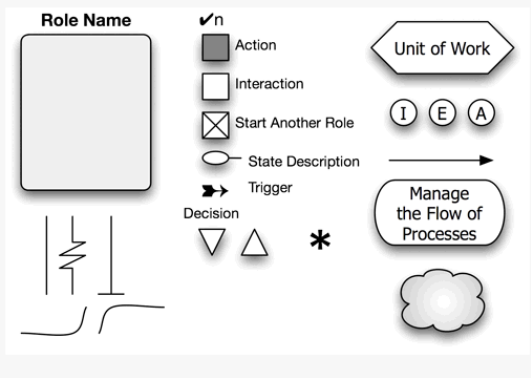


Figure 15. Role Activity Diagrams (code)
(Source: http://graffletopia.com/images/previews/140/original.png?1250609327 accessed on 06 august 2011)

Using the above code we have developed the role activity diagram of the admissions process. There is an intension to clearly present who has the responsibility for the administration of the flow of the process, who interacts with whom and also to register any discrepancies in the communication derived from the roles. For once more there is a conflict between the Marketing and the Central Administration Office in terms of the flow of information and how this could be developed and distributed in a more sophisticated and effective way.

In such cases the specific diagram can reveal any weaknesses and more specific, focus in the areas that could be used as the basis for change or even a total restructure in the information and knowledge diffusion.

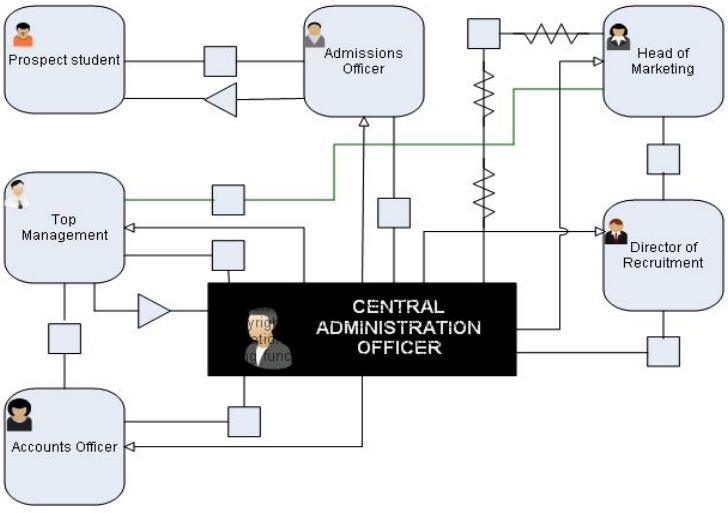


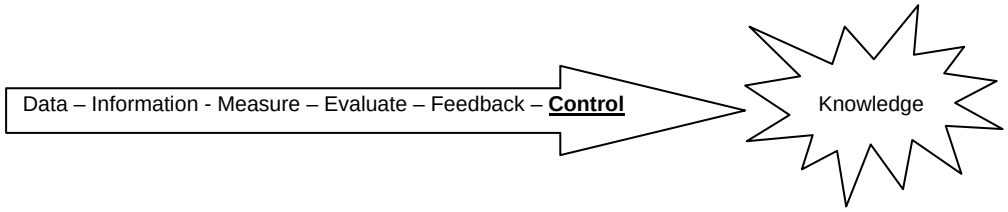
Figure 16. Role Activity Diagram of the Admissions Process

This diagram has contributed in the idea of start investigating the change of the existed information system of the institute and upgrading to a new model.

6. Information, Control and Organisational Processes

The existed information system has established among others certain limits on human power and process issues. As illustrated in the previous diagram, the central administration office has a significant power in terms of access to the knowledge and the control of it as well. As a result, this creates imbalances which decrease the total efficiency or in other words mitigate the importance of results. Although there is strong know-how and expertise in staff to support the processes implied by the strategic plan of the institute, current model has obvious restrains.

The framework of the organisational process is based on the elements presented below and this directs to knowledge.



The staff has adapted its behaviour to the current model and the way this is controlled. Combining that this model is considered inadequate their reactions are not easily predicted and especially when new challenges are ahead they tend to justify the overall avert due to the system. The task discontinuity could be characterised as the basic cause. It was identified that we have to measure and control the admissions process according to common objectives and not only for the administration or the admissions office.

So far the aims are related to the control applied only from the administration, which is the dominator and shares the knowledge with others. There is no sophisticated interaction and more there is no exchange or even merging of objectives with other offices. Of course all entities operate under the same strategic plan but from a different perspective.

At this case the adoption of cybernetic control could be considered as an essential intervention. The involved offices may define the admissions process jointly by following the next model:

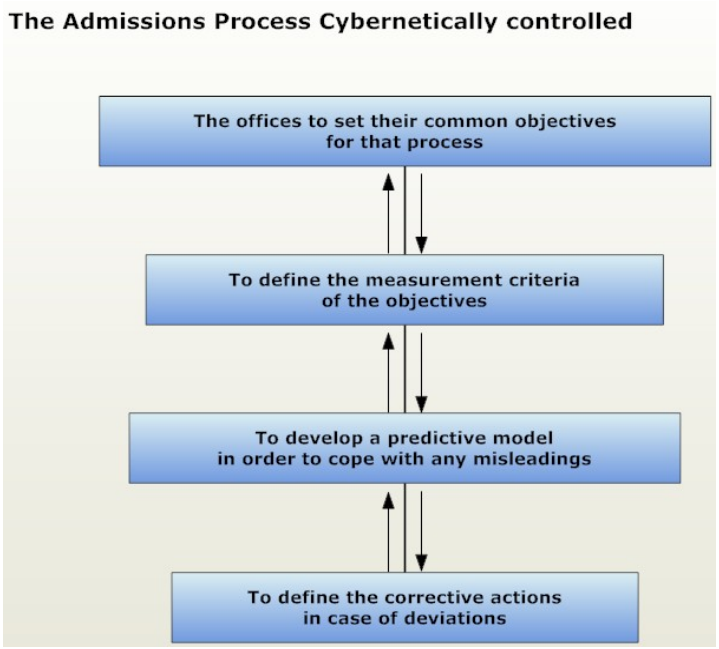


Figure 17. Admissions Process – Cybernetic control

The above model could aggregate the different expectations of the offices regarding the specific process and ensure that the final results will satisfy their primary objectives. On the other side, such control strategy is expected to alter the behaviour of staff and force them to involve in the whole process.

The way a working activity is controlled defines the behavioural model and the reactions of people which in continuous defines the organisational performance.

7. Opportunities and Challenges

There has been an effort of grabbing the E-Business opportunity, by implementing a part of the admissions process through a CRM platform which primarily focused in the on-line application submission of the candidates to the central database. This is the first phase while next steps incorporate the merging of the CRM with the existed information database system. This activity is taken place through an outsource partner and already experiences difficulties and delays mostly due to the extra resources that are needed by the institute to support the transition phase.

No doubt the importance of B2C context which in the specific process is considered more than obligatory, but it is necessary to delegate resources in it. The institute has already an overall E-Business strategy which aims to create business opportunities and modernise the education processes not only for students but also between staff. This plan adopts the four key aspects according to *Laudon and Laudon (2006)* and is the following:

- Giving the chance of acquiring E-Business techniques to focus in innovation;
- Prioritise the customer relationship and give effort on the rich and effective interaction;
- Re-evaluate and re-structure the knowledge infrastructure for the successful delivery of the techniques;
- Evaluate the financial perspective each time that new techniques have to be adopted;

Probably this four-pronged strategy, could be implemented more effectively if there was a separate entity in the institute which among others could undertake the responsibility of getting things done according to this plan.

8. Large scale integrated applications

The current information system of the institute is based in one integrated database which actually is divided in smaller databases. It does not work through internet-based platform but on the contrary as an intranet. There is one part of the admissions process which is currently in the transition phase of outsourcing it through an external ERP system, as described earlier. The aim is to connect in the near future all databases with the ERP system and use the new internet-based platform. There are some problems though during the implementation but this is expected to be overcome.

Since an ERP can serve as a backbone for certain business functions in an organisation, this is a widely accepted solution for automating key aspects of processes such as the admissions process.

Nevertheless, the quick expansion of the institute and the penetration in new markets implies newer and more effective solutions. Educational institutes, although entrepreneurial oriented and more market-sensitive, still appear to have some specialties which most of the times place dilemmas in terms of centralisation or decentralisation or even outsourcing or keeping inside.

For example, the complexity of administrative processes in an educational institute creates necessities which most of the times are similar to logistics operations. Actually, the admissions process could be represented in a supply chain manner where people, time, cost, processes are part of the chain.

Acquiring such techniques could create a competitive advantage for the institute since this will alter the approach and the real operation of processes. The supply chain integration could be a real challenge in the administration of an educational institute.

This can be implemented either through an ERP2 application, meaning that the institute should address its demands to an external service or through an internal application which could be built step-by-step from a technology oriented office. Such office could be used as an incubator for the administration.

9. Challenges in complex projects in information systems

The admissions process by itself is a complex project. Most processes in the education administration are complicated since there is usually high level of interdisciplinary action, interdepartmental overlaps and lack of communication. These, in combination with management expectations reveal most of the weaknesses of complexity. On the one side, emerging technologies provide more and better applications but on the other side the implementation is more difficult.

Taking into consideration that any information system can be implemented primarily through project management techniques, this directs to the necessity for the institute of focusing in its human resource and their level of expertise.

So far, although the description refers to the admissions process, a pure educational administrative process, there come up issues about logistics, project management, organisational performance and technology.

The administration has to face the marketing and other offices' demands on the one side, while on the other side it is obliged to cope with the complexities of the system.

10. Emerging trends

Emerging trends related to the information system of the institute and more particular to the admissions process, include demand from users to have continuous access and retrieve results according to their expectations. Accessibility, easiness, flexibility and sophisticated reporting are more or less what have been registered so far. It is more of an interactive game between the system and the user which in professional terms can provide the knowledge and guarantee for its validity and content.

It is worth to mention the evolution of open source software, which although has still some technical problems (cohesion) is an alternative solution. If the institute for example decides to keep the application inside, like the administration office in the current system, this could be combined with other applications.

For an academic institute it is better to keep its independence in terms of administering its information and do not depend in an external entity, at least in full mode. Trying to catch up with the emerging trends, a combination of ready-made and customised software (open source as well) could be an ideal model for adoption. The institute already have exploited solutions of mobile technology in order to improve its services both to students and academic staff. This involves so far mobile telephony (sms) applications, social technology and social media applications as well as personal e-mailing options which all focus in building a customer loyalty profile.

11. Implementation and intervention information systems change

It is suggested to apply a change in the organisation's structure in order for the administration to cope with the new challenges and demands described so far.

It is obvious that an entrepreneurial oriented institute needs more than an information system to use as a compass in risk and uncertainty. On the other side a high-level information system cannot be implemented unless there is the infrastructure. An executive information system aggregates the characteristics of a more strategically operating system which aims to provide with knowledge the upper management of an organisation. In addition such knowledge could be diffused in other departments in a format that can be used for different objectives. This system is a combination of experts and applications. Motivated by the admissions process the institute is recommended to establish a new office which will apply an executive information system and this will be the Business Intelligence Unit (biu).

This will undertake the responsibility to cooperate with the offices on separate basis. It will emphasize in:

- The effective communication between staff
- Analysing each task of the admissions process
- Better filtering the information administered
- Taking into consideration the demands of colleagues and synchronise the process with them
- Controlling the process in order to align the activities with the objectives of each office involved
- Keeping close track of activity roles
- Enabling the use of latest technological techniques in the use of the system

- Increasing the quality of reporting provided
- Infusing knowledge in the reporting
- Exploiting feedback provided from others and turn it to effective customised applications

In order to provide people with sophisticated reports it is necessary to work as a department with the relevant tools. This implies a separate team of experts who will comply with the techniques described previously. The institute currently faces the big challenge of getting into a more sophisticated level of administering the information and using effectively the knowledge produced. Taking as an example the admissions process which due to its complicated characteristics and nature of involved groups could be used as a satellite for future changes, it is of importance to decide whether this challenge could be faced as an opportunity rather than a problem which needs to be solved.

There is an effort to present the necessary changes to be done as identified so far, which in continuous ensure the proposal of establishing the new department as declared above. The changes introduced are due to the specific process and do not cover the institute's overall.

Area of change (what needs to be changed)	**Type of change**	**Who needs to be involved** (roles, groups, individuals)	**What is expected**
The social relevance of central administration office; this is how the office perceives itself as an entity and how the others perceive its position and contribution to the institute;	• Attitudes of people	Top management; marketing office; recruitment office; admissions office; accounts office; academic departments; central administration office;	Build gradually a new image for the office; advance its position and raise its significance in the institute;
The administration office's staff synthesis (staffing); knowledge societies need expert and technology-oriented people; administrators that will handle complicated and demanding tasks;	• Knowledge and skills of people	Top management; central administration office;	Improve the intellectual capital of the office; upgrade it, to a point-of-wisdom;
The re-engineering of the process; this affects mostly the parts that have to do with the diffusion of knowledge and not with the primary process itself; if the results are well-structured and on time this will affect the rest of the offices;	• Activities and tasks that people undertake	Top management; marketing office; recruitment office; admissions office; accounts office; academic departments; central administration office;	Brush up the efficiency of the admissions process;
The internal marketing face of the administration; even not able to satisfy all needs and expectations the positive communication with others may bring good results and establish common objectives;	• Communication between people	Top management; marketing office; recruitment office; admissions office; accounts office; academic departments; central administration office;	Stimulate the positive attitude and establish a different organisational behaviour;
The reporting process and its core operations; more qualitative attributes should be included and more parameters should be involved by the administration; the bottom line is to achieve a higher level and more sophisticated reporting which would provide staff with ready-knowledge;	• Information	Top management; marketing office; recruitment office; admissions office; accounts office; academic departments; central administration office;	Upgrade from an ordinary information system to a sophisticated executive information system; turn the knowledge to wisdom;
The administration office's structure, and objectives; the office will continue to be in the centre of knowledge; this will affect the powers and the balancing of the operations;	• Power which makes human societal structures operate in particular ways	Top management; central administration office;	Synthesize a winning team which will lead and support;
The administration office's primary aims; a more dedicated department is expected to bring results better and quicker; if there is a demand for control this	• Control to try to align activities to purpose	Top management; central administration office;	Contribute to the brand equity of the institute;

should be done in an organised way;			
The use of technologies; the administration should adopt a more complex philosophy of using different applications under an integrated one which will increase its flexibility and efficiency;	• The enabling technologies	Top management; central administration office;	Innovate in using appropriate technologies as tools for achievements;
The office's priorities; any change on this could bring change in roles and the relationships among other entities/offices;	• Roles relationships	Top management; marketing office; recruitment office; admissions office; accounts office; academic departments; central administration office;	Establish a mentality of seeing outside the box;

Table 1. Areas of change and expected outcomes

According to the table above, it is obvious that the changes requested are complex and affect many entities. It is not expected to be faced on an individual basis, therefore the recommendation of a new office which will undertake the responsibilities mentioned in the top left column of the above list, could satisfy the change as a whole.

The new unit is expected to infuse the institute with the alternative thinking. Standard procedures have been undertaken so far by the central administration office which maintains the management information system of the institute. The upgrade to a more intelligent information system implies ability to (a) redesign the process, (b) restructure the team of people and the way they contribute to the process, (c) implement the process in a way that will operationalise the policies and strategies of the institute.

The recommended intervention is expected to satisfy such requirements.

Area of change (what needs to be changed)	**Who needs to be involved** (roles, groups, individuals)	**What do they need to know to see the need for change**	**How am I going to help them engage in the issues? How am I going to make intervention?**
The social relevance of central administration office; this is how the office perceives itself as an entity and how the others perceive its position and contribution to the institute;	Top management; marketing office; recruitment office; admissions office; accounts office; academic departments; central administration office;	The importance of the central administration office and how this could contribute to their objectives;	Present past experiences and results of the office; Communicate the importance of the common interest;
The administration office's staff synthesis (staffing); knowledge societies need expert and technology-oriented people; administrators that will handle complicated and demanding tasks;	Top management; central administration office;	What has been achieved so far and what could be done in the future; which are the potentials of the office;	Discuss the socio-economic status and highlight the importance of human capital;
The re-engineering of the process; this affects mostly the parts that have to do with the diffusion of knowledge and not with the primary process itself; if the results are well-structured and on time this will affect the rest of the offices;	Top management; marketing office; recruitment office; admissions office; accounts office; academic departments; central administration office;	The mutual benefits of the structure and their immediate impact to each one separately;	Spread the advantages of shaping a commonly-agreed process;
The internal marketing face of the administration; even not able to satisfy all needs and expectations the positive communication with others may bring good results and establish common objectives;	Top management; marketing office; recruitment office; admissions office; accounts office; academic departments; central administration office;	The significance of a well-organised central administration office; the willingness to support the others and provide its knowledge in a distinct way;	Emphasize on the strategic plan of the institute and focus on the compatibilities and consensus among all offices;
The reporting process and its core operations; more qualitative	Top management; marketing office;	The opportunities derived from an advanced	Demonstrate the results of sophisticated reporting in

attributes should be included and more parameters should be involved by the administration; the bottom line is to achieve a higher level and more sophisticated reporting which would provide staff with ready-knowledge;	recruitment office; admissions office; accounts office; academic departments; central administration office;	reporting system;	specific projects; make such reports part of the daily routine;
The administration office's structure, and objectives; the office will continue to be in the centre of knowledge; this will affect the powers and the balancing of the operations;	Top management; central administration office;	The way the central administration office can affect the whole organisation; its position and its level of contribution on every aspect;	Argue the significance of keeping a centralised unit for the sake of unity and coherence; maintaining links among offices through a common reference point which could be this office;
The administration office's primary aims; a more dedicated department is expected to bring results better and quicker; if there is a demand for control this should be done in an organised way;	Top management; central administration office;	The job description and the wideness of the activities;	Target to the alignment of the office with the strategic plan and the expectations from it; this implies more specialised and dedicated tasks that it should undertake;
The use of technologies; the administration should adopt a more complex philosophy of using different applications under an integrated one which will increase its flexibility and efficiency;	Top management; central administration office;	The worth investing practice in new technologies; the enormous advantages of acquiring the first mover's privileges;	Activate links and applications that incorporate this philosophy; present them to the interested parts;
The office's priorities; any change on this could bring change in roles and the relationships among other entities/offices;	Top management; marketing office; recruitment office; admissions office; accounts office; academic departments; central administration office;	The skills and talents of expert staff; how these can be used in compliance to the strategic plan;	Present the competencies and abilities of staff;

Table 2. Communication of changes and its implementation

The central administration office will be merged in the business intelligence unit. The new unit will be staffed with additional members and will exploit the past experience and culture as given by the central administration office. The aspects discussed in both tables in this section, direct to a conclusion. This is what has to be done based on what have been discussed and presented in the previous sections of this paper. Obviously, there is a need for change, no matter if there will be change barriers or even risk avert. At this point, this is that the new unit will do. It will cope with the challenge of turning the current system into a more advanced, according to demands.

My role to this change, as the person responsible for the administration, should be to unleash the powers of existed knowledge and support the transformation of the department to a more technology-oriented according to demands and expectations of others. I am expected to:

- design the new unit;
- consider for the resources and its operational activities;
- identify the position and impact of the new unit within the institute;
- analyse the processes (admissions process and others);
- prepare staff for the transition to the new status with the new unit operating;

This could be done if separating the knowledge from operations and while keep the administration at its present status we create the business intelligence unit as the main pole of it. To be more precise and clear, below is given how I will perceive the big picture of the new unit and its position in terms of knowledge diffusion and information share within the institute.

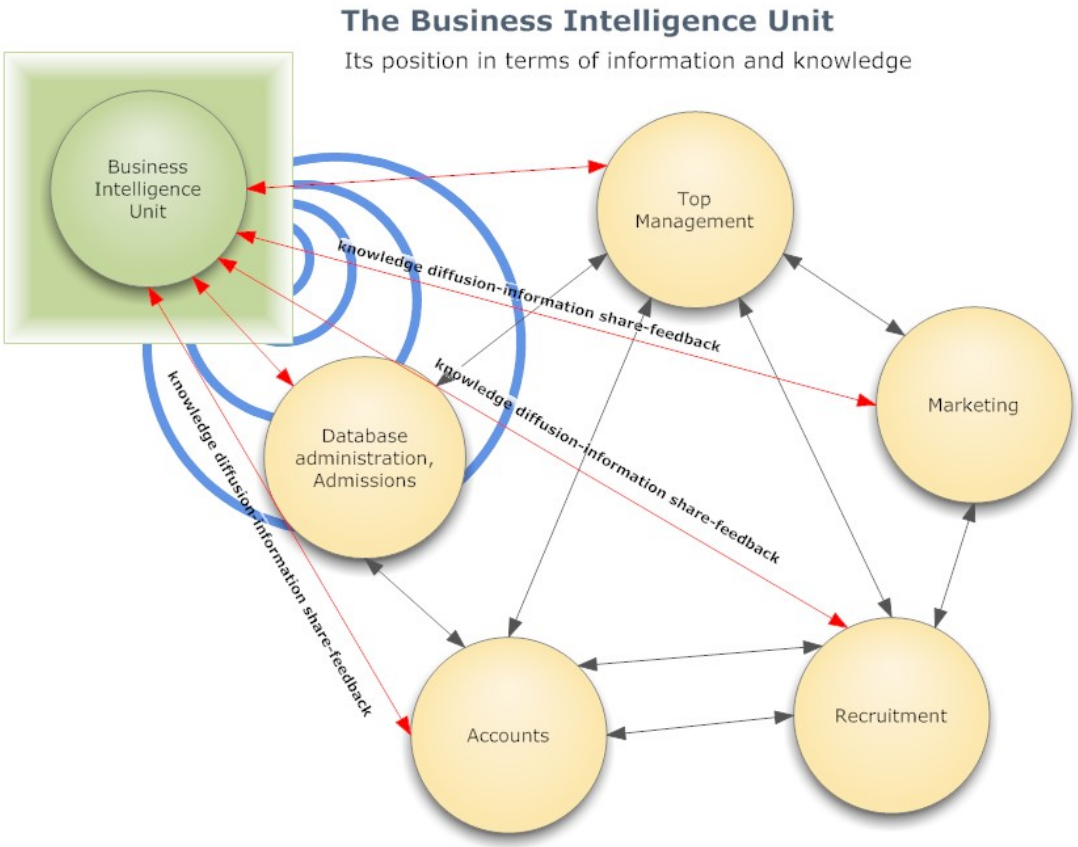


Figure 18. The Business Intelligence Unit

The business intelligence unit will remain part of the administration department. But it will constitute the innovative part of it. Keeping track of information system issues, this will be the forefront of the changes.

The model introduced implies changes to take place and people to be involved and support the new scheme. At this point it is interesting to include a useful table which describes the benefits and the drawbacks of establishing a technology oriented unit in general. Although this is not the full case it seems to register interesting points that could be under consideration.

Benefits	Drawbacks
• Speed and flexibility • Free from traditions and obsolete processes • Can expand and recruit quickly • May attract young ambitious enthusiasts and high-ranking outsiders • Idiosyncratic individuals can be protected • Free to organize itself • Able to focus on e-business • Expedites development and standardisation • Reduces 'reinvention of the wheel' across the organization • Economies of scale in development, investigation, implementation and R & D • Facilitates knowledge acquisition and organizational learning	• Accentuates its difference and perceived as an 'outside' threat, causing distrust and uncertainty • Stands administratively alone and carries own overhead costs • High profile makes teething problems and mistakes highly visible (can't hide financial indiscretions) • Need to market its services • Need to build relationships • Distant from other stakeholders • Lack opportunity to secure easy projects • 'Last in, first out' • Difficulty to establish centrality, non-substitutability and ability to reduce organizational uncertainty

Table 3. Benefits and Drawbacks of setting up a separate e-business unit
(Source: Chu, Catherine and Smithson, Steve (2007) E-Business and organizational change: a structurational approach. Journal of Information Systems, 17, pp. 384.)

Moreover, when decide to proceed in such changes it is crucial to collect further information about difficulties that could be faced. In the next table it is given a series of issues that will raise and should be under review during such structural strategic changes.

E-business	• Highly pervasive 'technochange' with considerable depth and scope
	• Implementation requires explicit human intervention
	• Technical issues are important but social issues may be more significant
	• Change agents confront:
	  • Structural contradictions with traditional business and traditional IT
	  • Large changes may lead to conflict but small efforts achieve little
	  • A separate e-business unit vs. integration with traditional department

E-business initiatives as agency	• Change is 'feasible' but requires considerable effort and cost
	• Change agents
	  • Need sustained senior management support
	  • Initiate the task of changing existing organizational structures
	• Change targets
	  • May be comfortable with traditional structures
	  • Tend to resist change efforts that threaten their position
	  • Reproduce existing structures that enable and/or constrain change
	• Both change agents and targets reflexively monitor their environments and act purposively and knowledgeably to secure their best interests
	• Unintentional consequences of intentional actions may still arise

Organizational structures	• Often complex and contradictory but may be deeply embedded
	• Guide, facilitate and constrain working lives, yet are maintained by the people concerned
	• Dimensions of structures are closely interlinked
	• Stakeholders should perceive the change as value-adding and non-contradictory (signification)
	• Widespread support allows change agents to reproduce their domination structure but lack of support favours contradictory domination structure
	• Structural contradictions
	  • Arise from change
	  • Destabilize and confuse change agents and lower their status
	  • May become conflicts if stakeholders have motive and opportunity
	• Norms reinforced over time can be very resilient especially when organizational homogeneity contradicts the change (legitimation)
	• New structures need to be nurtured to become institutionalized

Duality of organizational change	• Organisational change is a complex, dynamic, recursive interaction between structures and actions • It is a duality in which the change agents shaping the organization also shape themselvs but, in so doing, create new structures that, in turn, facilitate or inhibit their further actions and constitute their identities

Table 4. E-business as organisational change in large organisations
(Source: Chu, Catherine and Smithson, Steve (2007) E-Business and organizational change: a structurational approach. Journal of Information Systems, 17, pp. 385.)

On the other side, according to *Papageorgiou and Bruyn (2010),* the investment in an executive information system would bring a number of benefits for the organisation, as given in the next table *(table 5).*

Why investing in EISs will benefit your company
All executive easily able to compare and access across the group.
Availability of critical data.
Consolidate and make available to key decision makers group information which was not available before due to our decentralised management philosophy.
EIS allows for control; Quick decision making; Poor performance detection and quick action; and Good communication.
Fast, efficient and cost effective way of implementation.
For increasing productivity and using people to full potential; Managing the business instead of spending time number crunching; As a competitive advantage; To stay on the leading edge; and
To have visibility across the value chain - to create synergy.
Group wide information capturing and sharing were required.
The manipulation of management information is the essential key to success in business.
It's not the technology that matters, but how the information is used.
It has enhanced the quality of decision-making in the organisation.
Management of data and information flow.
Mechanism to deliver reporting.
Our company operates in a very competitive environment and decision-makers are highly dependant on accurate, near-real-time information.
On the spot decisions can be made with the availability of information.
Quick decision making.
Sometimes difficult to explain to non financial and non technical people that information systems have a place in an organisation.
To realise the benefit

Table 5. Investing in the Executive Information System
(Source: Papageorgiou, Elmarie and de Bruyn, Herman (2010) Creating Strategic Value through executive information systems: an exploratory study. Journal of Information Systems Evaluation, 13(1), pp. 388-389)

According to the researchers above, the return to centralisation is considered as an advantage since this will creates a framework for quick decision making and will increase the velocity of knowledge and the overall effectiveness of the system.

12. The new economy and the role of knowledge technologies

According to *Kimble and Hildreth (2005),* the Knowledge Management tries to capture-codify-store the knowledge in order to manage it. This is in general terms its mission, combined with the fact that it aims to support the organization to cope with new challenges. Learning and knowledge are two related concepts. Learning is the key resource to the knowledge available.

The new unit will use knowledge management technologies to develop the human learning activities and cultivate a friendly and innovation-oriented environment in regards of training the human capital of the institute. The tools will be adopted for:

- Often use of emailing contacts which will have rich knowledge content (bulletin boards, interactive information);
- Predefined and asynchronous chat sessions with colleagues using popular applications; this will be both for formal and informal communication; the idea of communities of practice should be of great concern for adoption and implementation;
- Direct access to the institute's databases through ready-to-apply profiles to all users;
- Development of on-line collaboration tools, which are used for e-learning sessions;
- Extensive use of social media and social networking applications in order to present the knowledge and support the distribution of it;

The above described are the tools for learning. Below it is given the admissions process, but from the perspective of knowledge development.

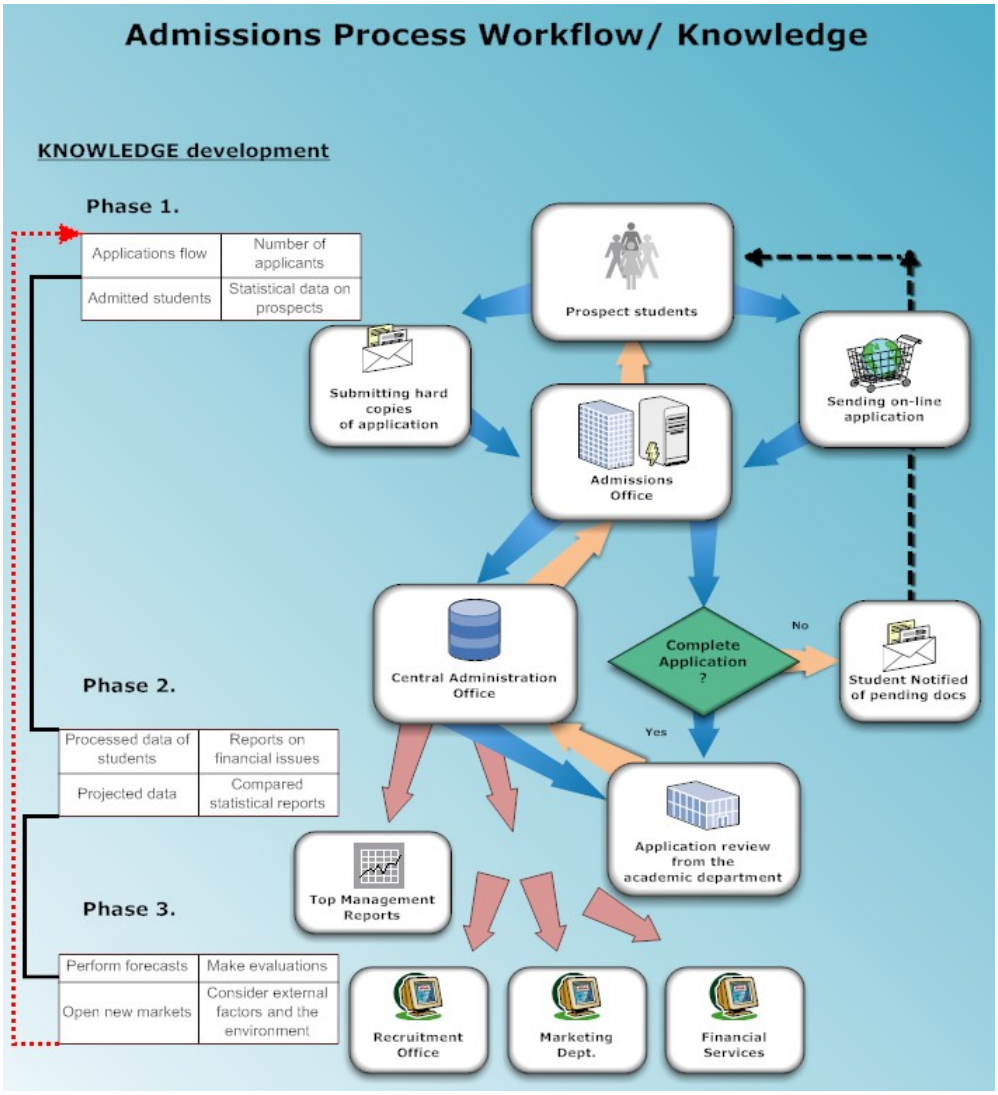


Figure 19. Admissions Process Workflow – Knowledge development

This is actually the admissions process but with the additional dimension of attending how the knowledge is developed from phase to phase in the information's flow, in the system.

13. Reflections

The change introduced could be identified as a technology-enabled strategic change for the institute. Based on what *Hsiao and Ormerod (1998)* have claimed about strategic change, it is presented a change structure, where it registers the triggers of the strategic change for a company and how it can react and manage this change to use it for its own success *(Figure 20).*

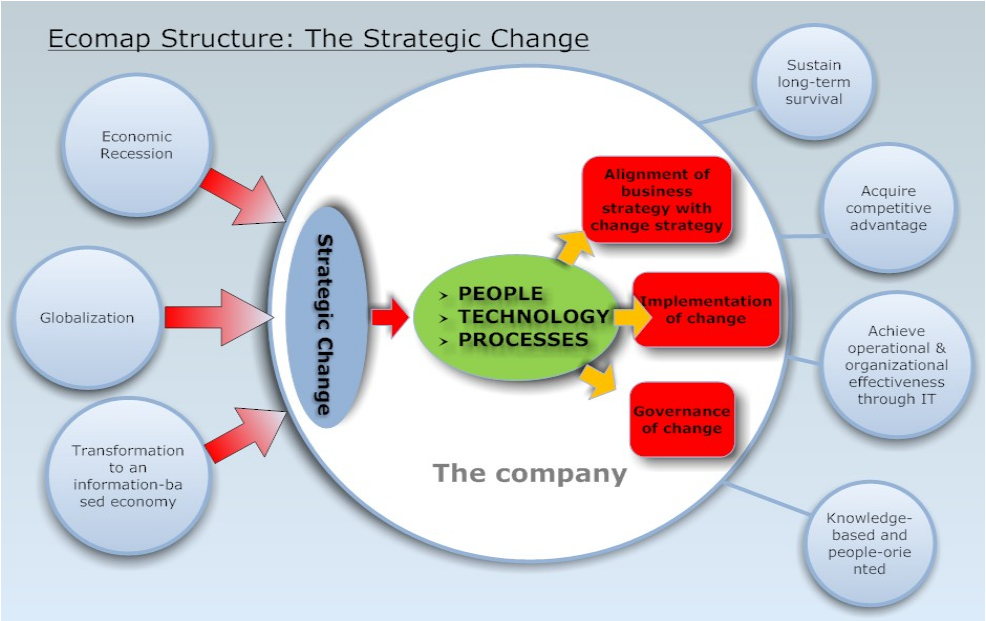


Figure 20. The structure of the strategic change

The change in the institute should be organisational and to be precise, strategic. It will be part of the business model as well as an essential element of the strategy itself. Information systems and ICT in general may be the enablers for change towards development. People, technology and processes are adapted to strategic change which is dictated from external factors.

Throughout this analysis it was found in literature a dynamic model of change as described by *Gardner and Ash (2003).* They tried to represent the variables and entities that participate in a change process, and how they interact. It was considered interesting to include it since it appears to have common attributes with the existed process under change.

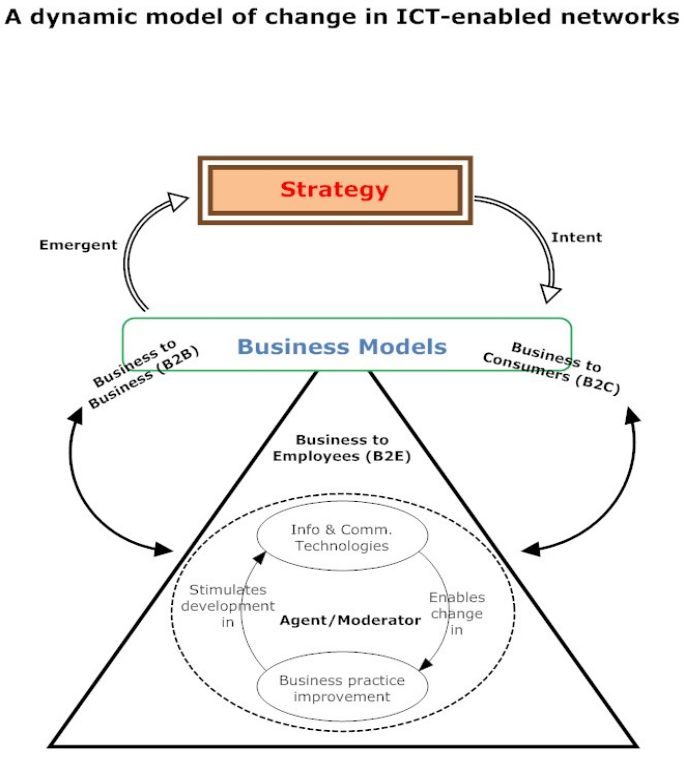


Figure 21. A dynamic model of change

CONCLUSIONS

The strategic role of information technology and its significance throughout the organisation increases complexity, variety and the need of change. Therefore, an information system among others, must deal with uncertainties derived from different, conflicting and ever changing demands *(Hugoson et al, 2010).* Moreover, information technology plays a central role as a driver for innovations *(Amberg and Lang, 2010).*

The business intelligence unit will apply the new structures and will administer the migration of the current management information system to an executive information system. This will be its mission in overall. Moreover, it will implement the necessary tasks to perform the change of processes and activities in order to activate the new system quickly and effectively. This should follow the principles of unity and coherence *(Larsen and Levine, 2005).*

Although the intervention recommended is technology-oriented and refers to the information system and its administration, this actually implies a number of internal organisational changes that need to take place in the institute. The knowledge infrastructure of the institute is necessary to be altered and adapted to new demands and challenges. With this intervention knowledge diffusion will be guaranteed and information share will be secured and effectively used.

Nevertheless, the real change copes with a more complex demand for the institute. This is the strategic decision to go forward and meet uncertainty being equipped with late technology information system and human capital that is ready to boost the organisational performance beyond the usual measures.

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