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## Management at Higher Education Institutions (Focusing on University of Korca, Albania)

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### ABSTRACT

"Higher education contributes to your life success. It makes you more competitive in the world of business and global economy. Higher education is the future of a healthy and powerful nation. It is essential for achieving high levels of economic growth".

To speak of higher education is not difficult, but is difficult to understand and apply it in the practice to higher education's institutions.

This paper has the aim to give an overview of the development of higher education in Albania, analyzing quality indicators. Analysis of higher education management is concentrated at the University of Korca, a university of southern region of Albania, with four faculties.

In order to analyse the problem; the study will evaluate quality indicators in this university vs. the labor market and budget of the university for some years. For this study were used 100 students from 12 departments with 1200 in total ( 85,4% response rate)

This paper determines the best way for success management of the university and recommendations for the future.

### Introduction

This paper has reviewed the literature which is relevant to critical success factors of total quality management (TQM) and its implementation in various areas, especially in higher education institutions. As defined by British Standard Institution, TQM consists of a "management philosophy and company practices which aim to harness the human and material resources of an organization in the most effective way to achieve the objectives of the organization". Many researchers have reviewed applying of TQM in higher education institutions, but some of them are skeptical. So, Cashton (1994) has identified obstacles, which include insufficient trust between departments and low confidence levels of ability to manage the process: "Under these circumstances, it does not appear that, for the foreseeable future, British universities are in a position to adopt TQM philosophy."

There are three generic approaches to Total Quality Management (TQM) in higher education (Harris, 1994): - there is a customer focus where the idea of services to student are fostered through staff training and development, which promotes student's choice and autonomy;

- Approach has a staff focus and is concerned to value and enhance the contribution of all members of staff to the effectiveness of an institution's operation, to the setting of

policies and priorities; - approach focuses on service agreements stance and seeks to ensure conformity to specification at certain key measurable points of the educational processes. Evaluation of assignments by faculty within timeframe is an example.

Sangeeta (2004) considers education system as a transformation process comprising of inputs of students, teachers, administrative staff, physical facilities and process.  
TQM in Higher Education

Hasson and Klefsjo (2003) define TQM as "management strategy that has interrelated components, namely core values, techniques and tools". Whereas according to Scrabec (2000), "TQM should be viewed as TQE (Total Quality Education). This model moves beyond customers to include society and business beyond student". However, Zairi and Youssef (1995) argue, "TQM must be viewed holistically by examining management factors such as institutional goal statements, long-range plans, and assessment techniques". Owen (2001) states that "Total and continuous quality improvement is seen as a journey not as destination and as such has no real beginning or ending".. TQM is a managerial tool to fix the problems relating to services as well as approaches in education industry and it can standardize the education industry.

Factors which have an impact in higher institutions can be:

- The pressure from budget reductions. In an era of economic crisis, HEIs are experiencing severe pressure from budget reduction, and they are obliged to establish new rigid systems of quality assurance, new rules and regulations and tight monitoring. So, academic leaders have been forced to develop more competitive ways to explore and embrace new roles in order to tap on institutional resources and core competences. Furthermore, the study of leadership in higher education faces many difficulties due to the dual control systems, since leaders have to excel in different contexts including administrative and academic departments and to deal with mixed expectations. Strong leaders are supposed to instigate change processes, set overarching objectives and formulate the necessary strategies to accomplish them. Nevertheless, empirical evidence supports that some strong leaders with clear and predefined objectives about the outcome of the evaluation process such as well-structured self-evaluation reports may have a negative impact, because they actually suffocate motivation and involvement from the academic staff.
- The lack of a participate culture. This problem stimulating discussions and analysis for current and future actions may conclude to disappointment and alienation among the staff or even resistance to change. Institutional culture may be defined as the collective personality of a HEI and reflected at the shared values, beliefs and behaviors of its members. Elements of culture such as autonomy from external control, adaptation, morale, conflict resolution, goal achievement, and formalization modify the degree to which faculty and administrators accept policy or changes associated with QA initiatives.

Literature review supports a positive effect of the aforementioned systems on organizations as a whole, empirical evidence reveal that resistance to accreditation by employees may be attributed to increased workload and bureaucracy, negative emotions of stress, insecurity and distrust, low level of commitment, autonomy restraint, lack of knowledge and experiences, and limited acceptance of the system.

It is very important to study all the best global conventions in order to create a model which is a combination of these conventions.

No matter how a university originates, a historical product or a newly-founded one, it is certain that it will coincide with one of the four conventions that have characterized global education. These conventions are known as the Napoleonic system, the Humboldtian system, the American system and the Newman system.

Brennan and Shah recognize four types of assessment based on quality:

- The academic type
- The managing type
- The pedagogical type
- The employment type

The first one is based on the traditional academic values, while the second type is associated with a focusing in the institutional assessment, concerning the procedures and the structures and the supposition that quality comes from a good management. In the third type the focus lies in the teaching ability and practice. In the fourth type the focus lies in the characteristics of the graduated output and in the standards. In the second and third type the values of the quality are not varied in all the institution. While in the first type they vary, in the fourth they can be both varied and no varied.

### **General View in the Albanian Higher Education**

The first educational institutes of the higher education were opened after the Second World War. In 1957 it was created the first university, which was followed by the creation of other universities based on the Russian higher education system. Thus the higher education in Albania was for a long time a closed system.

However, with the passing of the years, the situation has changed and the higher education has felt the necessity to adapt to the latest economic and social development in Albania. If we take a glimpse to the development of the higher education in Albania during these years of transition we will notice some aspects of its evolution among which we can mention: The change and modification of the manner of student acceptance in universities, the change of the programs and curricula according to the framework of Bologna, the increase in the number of universities, the opening of new studying departments, the increase of the academic staff and its continuous qualification in western countries, the tendency to develop the non-public higher education alongside the public one.

The generally positive evolution of the higher education in our country was accompanied with a series of difficulties:

1. The abandonment from the auditorium of a considerable number of qualified staff (because of immigration or employment in government administration or private sector)
2. Partial and confusing autonomy especially in the financial area
3. Quantitative expansion and extension of the universities detrimental to the quality
4. Difficulties and lack of capacities in the auditorium, modern equipment and in the everyday and massive means
5. Decrease of the discipline of scientific research
6. Difficulties in offering and hiring as assistants, the best students because of the low wages.

A tendency in the higher education has been the 'massiveness'. The highest number was of the students involved in the full time system with 69%, 19% in the part time system and 11% in the correspondence system.

### *Ensuring quality in the Albanian Higher Education*

Ensuring quality in the system of higher education is of a great concern in all the European countries, not only in Albania. The quality in the system of higher education in a country, its assessment and monitoring is a decisive factor concerning the status of the systems of higher education.

There are various meanings of the term quality which often reflect the stakeholder's interest in the higher education, thus quality of the higher education is a multi-dimensional concept. It has to do with: students' admission, employment and qualification of lecturers, the facilities and equipment, the services with third parties and administration.

Financial autonomy – The higher education, in particular, is one of the fields that affects aids and precedes the process of the preparation of the conditions for integration following the western countries' tendency in higher education.

Institutional autonomy has three dimensions and even if one of its dimensions is not gratified it leads necessarily to the non-gratification of academic freedom which is in fact the

foundation of a university.

1. Financial autonomy is a dimension of what is called institutional autonomy. Financial autonomy means that the university must have the legal capacity to distribute internally and independently the funds given by the government and to use or self-administrate the nongovernmental income.
2. Structural autonomy means that the university itself determines the way it is organized. It determines its internal structure, i.e. faculties, departments, sections and its administration bodies.
3. Administrative autonomy means that the administration and management of universities must be their own responsibility as an institution. It is obvious that this administration must coincide with the national standards and ethics.

We need to find new ways in favor of the increase of the financial autonomy, aiming:

1. Elimination of the inefficient and superfluous parts
2. Insertion of new elements that respond better to the new financial delineation
3. Distinct designation of the rights and duties of all the cogs of the structure

The main achievements in Higher Education in Albania:

- Our system of higher education has grown around 3 times in 8 years and has achieved, in proportion with the population, the dimensions typical of developed countries. The number of the students getting an education in public and private universities has tripled compared with 2005. The academic staff has grown 2.5 times more compared with 2005.
- The State Exam entirely digitalized (computer based) was implemented not only for the first time but also according to international standards, in the field of health and education, aiming the increase of the level of preparation of the new specialists in the higher education institutions.
- It was created the National Database of students and lecturers and also, since 2 years ago, it is possible to have the national number of matriculation for every student by the National Exam Agency aiming the supervision and transparency of the system of higher education.
- It has been developed further and also it has improved the system for quality ascertainment and accreditation including international expertise in the Accreditation Council and in the Public Agency for the Accreditation of Higher Education, as part of the process of attaining full membership of this institute in the European network of accreditation agencies (ENQA).
- During the period 2005-2014 there have been financed 26 projects for building and 120 projects for reconstructing the campus, auditorium, libraries, dormitories, didactic facilities and other objects in the system of public higher education for building or reconstructing the campus, libraries and there have been equipped 102 science laboratories.
- The Pan-Albanian Cooperation in Education and Science
- It was created, in cooperation with the Education Ministry of the Republic of Kosovo, the joint abecedaries which is used today in the schools of Albania and Kosovo. The Joint Commissions of the two Ministries of Education in Albania and Kosovo are finalizing the unified Plans and Programs in the obligatory education.
- There have been implemented for the first time the programs (in 2005-2013) Brain Gain and the Excellence Fund to grow the human resources in the higher education. The Program of the Excellence Fund, started in 2007 and supported by a yearly financing of the Albanian government of 100million Lek, has aided 177 people who have applied for the scholarship for their university studies in some of the most prestigious universities in the world. With a total financing of \$ 1.5 million the Brain Gain Program has aided 141 beneficiaries.

### **The Access of the "Product" of the University Of Korça in the Market**

The identification, analysis and assessment of performance indicators of the public universities, which aim the increase of the "product" access in the market, are a very important process. This process takes under consideration some grouped indicators, including not only indicators of the analysis of the Teaching Performance, but also indicators of the Financial Performance of the universities; indicators of the Research Performance approaching

the European standards also indicators of the Internationalization of Universities, including here the participation in international publications and presentations.

#### *Teaching Performance*

The University "Fan S. Noli" offers the following programs in the full time and part time system:

- 24 full time Bachelor studying programs
- 13 part time Bachelor studying programs
- 15 full time Professional Master's Degree studying programs (Professional Master in Teaching Biology-Chemistry", "Professional Master in Nursing", (opened for the first time);
- 2 part time Professional Master's Degree
- 5 Scientific Master studying programs
- 1 Postgraduate studying program

The aforementioned data reflect the progressive growth of the university's capacities as a higher education institute which fulfills adequately the need for university qualification in the three cycles of study and in the two systems of study in the southeastern part of Albania. These data constitute a challenge in relation to the adaptation of the studying programs to the changes that the economic and social development of the region suggests, the use of European standards of teaching and especially lifelong learning and the conservation of a fairer student/lecturer ratio in the institution. Generally all the studying programs reflect a growing interest when compared with the year 2012-2013 when the total number of students reached 6357. During the academic year 2013-2014 6970 students were part of the University of Korçë.

#### *The performance of the academic staff*

The performance in teaching is closely related to the performance of the academic staff, where the main issues remain the lecturer/student ratio and the lecturer/guest lecturer ratio. In the University this performance is represented as following: 1/43 - 1/53

#### *Financial Aspects and their impact in the performance of universities*

The challenges for the quality increase and for the internationalization of higher education, together with the development of a qualitative scientific research activity have intensified the need for the growth and the diversification of the financing of the higher education. The review of the financing patterns of the higher education is in fact a European tendency and part of the modernization process of the system. A priority of the educational policies is therefore the optimization of the financial resources invested in a national level aiming the quality increase. The universities have to plan and make careful budgets within their budgeting limits. An element of the financial perspective is the government fund allocated to universities. In the University of Korçë this fund is increased by 5-9% every year.

#### *The Performance of the Internationalization of the Universities*

This indicator includes the participation in international presentations and publications of the academic staff, demonstrating estimating data in this respect. The participation in national and international conferences of staff has been very high in four faculties of this university. The University "Fan S. Noli" publishes regularly its Bulletin in two series. The bulletin of this year has just been published and there can be found the publications of 105 authors, respectively 30 authors belonging to the social science and 75 to the exact science.

Moreover, a growing indicator is the number of articles published by the academic staff of the university in the country and abroad, their number in 2014 was 130 articles compared with 87 articles in 2012.

### **Results of the study**

For this study were used 100 students from 12 departments with 1200 in total (85,4% response rate)

Considering of questionnaires, the correlation analysis (Pearson correlation) brought to light some interesting relationships:



- Teachers' crucial component of successful guidance and analytical feedback to students ( $r = 0.749$ ,  $P < 0.001$ ).
- The level of difficulty of the course, is positively related to the workload and the credits (ECTS) assigned to it ( $r = 0.595$ ,  $P < 0.001$ ).
- The usefulness of the exercise workshops is strongly related to the assessment of their overall quality ( $r = 0.795$ ,  $P < 0.001$ ).
- Regarding faculty, the students are quite satisfied from academic staff towards their duties such as: - their attendance to the courses;- the time spent for collaboration with the students;-the prompt correction of their project work.
- The correlation analysis verified that the more the academic staff organize their teaching materials, the better they succeed in stimulating the interest of the students for the course ( $r = 0.795$ ,  $P < 0.001$ ) and the better they can analyze and present the concepts of the course in a simple way, with interesting examples ( $r = 0.749$ ,  $P < 0.001$ ).
- The students are found to be moderately satisfied from the suitability of the classrooms and from the teaching equipment.
- The use of the Institute's library services is considered low (average 1.57 times per month per student), while the existence of the Career Office is more important.
- The degree of the awareness of the internet and network services of the Institute is high (85.4 %).
- The suitability and quality of the curriculum is strongly related to the sufficiency and the quality of the studies ( $r = 0.649$ ,  $P < 0.001$ ), the effectiveness of the faculty ( $r = 0.609$ ,  $P < 0.001$ ), but also the better link with the requirements of the labour-market ( $r = 0.749$ ,  $P < 0.001$ ).
- The sufficiency and the quality of the knowledge acquired in turn ( $r = 0.749$ ,  $P < 0.001$ ) as well as educators' relation with students ( $r = 0.609$ ,  $P < 0.001$ ) determine to a large degree the perceived quality of the course.
- A proper work placement for the compulsory industrial training required in all programs of study contributes positively to the higher quality of dissertation thesis ( $r = 0.516$ ,  $P < 0.001$ ).
- Some of important students' suggestions on the upgrade and improvement of support services are the following:
  - The incitement of the students to use the books of the library more as well as the enrichment of the library collection
  - The renovation and upgrade of infrastructure (classrooms, laboratory equipment).
    - The more effective promotion of the role of the Career Office.
    - Incitement of the students to exploit ICT facilities (e.g. web-page)

So, it is very important: offering feedback to the lecturers in order to improve teaching; assigning the capacities of the staff for promotion; helping students to select a course; and providing information for educational research.

## Conclusions

Higher education is a sector which has the priority in all the economies and especially in Albania since it brings a series of benefits which it sorely needs. These benefits can be included in 4 categories:

- Private economic benefits
- Private social benefits
- Public economic benefits
- Public social benefits

However, the laws related to the higher education are still in the level of centralization even if we talk about financial autonomy.

The diversification of the funds resources (students' fee) is proving to be the best option for the institutions of higher education, in order to fulfill the demand of academic quality. To achieve the desired result the commitment of 6 main actors of the higher education is essential: government, higher education institutions/provider, including the academic staff, students groups, and accreditation agencies, agencies for the academic and professional acknowledgment.

Unless the financial autonomy is guaranteed, the higher education will not obtain the utmost of the management of income in relation to the quality or other functions. This path leads necessarily to the increase of the quality of the final product "the validity of the diploma". This study highlights some conclusions expressed in these directions:

Higher education in Albania has undergone distinct changes in the recent years. The attempts made for the massiveness of school gave the opportunity to many students to be part of the university's auditoriums but also led to various problems. The challenge that the universities face today is the increase of the quality.

Universities today must attempt to increase the cooperation with the businesses, by developing studying programs that makes students skillful in concordance with the demands of the job market, also by promoting the undergraduates in this market. Thus, universities will become research centers in which the business enunciates the problems or the situations that it deals with and the solutions can be found through the concrete work done by the students working in location or by studying cases in class

The improvement of the quality of the system will increase the possibility to prepare qualified specialists in the fields required by our economy.

The unification of the formats of the regulations of the studying programs and syllabuses of certain subjects in every program. The continuous variations in the regulations of the studying programs, which reflect the need for adaptation with the social and economic changes of the country and the national and international developments which promote the professional ethics of the graduates, will continue to be an object of controversy in the constituent units of the faculties.

The attempts for the diversification of the university supply require the curriculum reform to be a priority and a strategic aim in the higher education reforms.

The challenge of the higher education is now the improvement of the quality, the diversification of supply and the increase of the system's flexibility in accordance with the demands of the job market.

The mechanics of the university's financing need to be reviewed basing them in distinct and measurable directives for the academic performance of the university.

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## Local Radio Part Involved in the Development Responsible of Local Communities

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### ABSTRACT

Local radio has an extremely important role in the formation of citizenship and ensuring a safe and harmonious development of the local community.

The terms of social responsibility, sustainability, and sustainable development are widely used in everyday speech and the general feeling is that society as a whole it is concerned with finding solutions and ways of action.

But unfortunately real concern for sustainable development, social responsibility is just the preserve of elites, academics and specialists.

Some foreign corporations acting in our country and clearly defined codes of conduct, management standards and use the concept of social responsibility in the current business performance take small steps towards achieving environmental, economic and social.

Usually responsible behavior corporations vary, so that the country of origin highly responsible corporation and the country in which they operate is legalist like behavior (for instance the law of the place).

Corporations under the pressure of responsibility to make profits are always one step ahead of the law.

As a rule legal charges (often made on the recommendation of international bodies and pressure) are ambiguous and easily interpretable which facilitates and promotes immoral behavior of the corporation.

At the same time the actions undertake by corporations which boost the activity of NGOs and foundations are actually only actions by which the media presentation of corporate interest to society. At the same time NGOs are financially dependent on corporate actions which cause their activities to be favorable corporation.

Paradoxically or not in our country that corporations act with a profit of 100 million offers local communities a maximum 0.006% of Fiscal value (data from the report of a soft drink bottling companies).

At the same time corporate actions will cause the corporation to be the long term to determine disappearance. Large chain stores that imports most food leads to the disappearance of local producers (short term) and also their customers disappearance (long term) which will cause the real objectives of the corporation to be reduced in time and purpose (immediate high profit).

Paradoxically in the countries of origin these food chains acquires especially in the surrounding areas (up to 100 km).

The only viable solution given in the conditions in which the legal provisions are indicative and outdated, in which corporations behave differently (depending on the area in which it operates) and the conditions under which NGOs are captive corporate interests as the emergence citizen civic.

The emergence of civic citizen will determine the appearance of public pressure is the only viable solution for local communities and for applying the concept of sustainable development. In the Nordic or German countries civics it is highly developed and has appeared as a result of both the education and especially as a result of the involvement of the media.

The role of the media is to promote the actions of elites, academics, professionals and the public to inform any immoral behavior made by corporations. Radio as part of the media has its role well defined and highly important.

Compared to television which is centered on the relationship with the actuality (news every hour) radio has the opportunity to shape the behavior of its listeners both through repetition (radio repetition transforms a mundane song into a hit) and by applying the concepts of social responsibility in the current activity.

Especially radio and local radio turns into an extremely important and valuable for sustainable development and safe development of the local communities it serves radio. Under the impact of local radio social responsibility concept acquires new functions and new ways of action.

#### *The role of the local radio classic*

Usually a classic local radio has four functions:

1. Information function
2. Entertainment function
3. Ambient music function
4. Fun/Good positive mood function

Information function derived from the need for the public local radio, listeners learn of developments, news, events that may have influence on their everyday work.

Usually the information transmitted by radio is either commercial (urban transport timetable) be preventive (weather). The fact of that information is processed and subject to personal interpretation makes local radio and tool handling, misinformation and hierarchy of events are made public. But applying the principles of social responsibility can cause these harmful effects disappear.

Entertainment function answers both the desire of relaxation necessary human body and especially the need to escape from everyday stress.

Such transmitted information about the work of celebrities about the history of music bands, various rumors and gossip causes listeners to escape into another world (the imaginary prevail feelings, emotions and memories).

Increased appetite radio listener to gossip and gossip and desire to make radios rating prompted the emergence of harmful behavioral patterns or false role models (examples of so called personalities - "manele").

Ambient music function answers the need of radio listener to combine current activity it carries with auditory support to ensure relaxation and a sense of reality.

Unfortunately pressure from producers of music (houses music) and the financial interest of the radio environment causes the music to be subjected to an arbitrary selection either and an exaggerated repetitions.

Good positive mood or tone of mind is to increase the capacity of memory and attention and concentration listeners.

Through repetition and exaggerated interesting selection of music, some news, using local radio manipulation is still a factor harmful to the public interest.

At the same time pressure from national networks, networks dumping policy, audiences under measurement, deformation public perceptions and desires, models imposed by current local radio networks make sure subjected a victim of extinction.

A local radio only chance for survival is the main application of social responsibility in the current business and transforming local radio in a responsible local radio. Survival local radio and turning it into a responsible local radio brings only benefits the community and ensure safe and responsible development of the local community to which he belongs.

A local radio developed on the principles of social responsibility has many more functions.

1. Utility functions through which information of local interest, useful information coming to relieve local community. Thus various program services to public entities that perform various actions taking place in the community and discussions over the actions that can influence the quality of life of the local community are the local radio realizes that utilitarian function.
2. Musical culture function is the function that ensures the perpetuation of local radio and performed musical trends and music education to its listeners.
3. Education function by promoting positive examples by cultivating feelings of moral, religious, patriotic, civic.
4. Promoting local values function, to support them and to create role models.
5. Forming opinions and attitudes function which comes local radio and community strengthens common views and attitudes conducive to making and actions.
6. Keeping alive the traditions of national function seeking preservation of national identity and community.
7. Supporting local businesses, supporting jobs in the community function.
8. Presentation of objective and ethical realities both in terms of editorial content and in terms of advertising function.
8. Support local initiatives and promoting local initiatives function.
9. Development of local civic function.

Local civic developed through local radio will cause a local community share the same values and principles, to be more communicative, more coherent and connected.

Also a local community with a high degree of civic will ensure easier application of the principles of sustainable development and will be a Stakeholder that will influence the actions of corporations active in the community and will force corporations to think globally but act locally.

The responsible local radio has the following responsibilities:

1. To make profit but where this is not possible responsible local radio can turn into a social enterprise.
2. To follow the law and be an example to the community
3. To direct ethically and in accordance with social norms and moral values of the community and with moral and ethical expectations.
4. To be a promoter of philanthropy and sponsorship.
5. To be promoter of environmentally responsible actions.
6. To be a good citizen and an example of civic community.
7. To put the interests of the community radio interests.

But as a radio to be responsible should the principles of social responsibility to be applied consistently, non-discriminatory and consistent with regard to:

- staff selection policy
- Economic policy of the station by charging appropriate rates and due process
- Responsible use radio instruments (news, reports, debate)
- clear determination of music and entertainment policy closely aligned with the needs and expectations of the community
- Responsible action in drafting and design multimedia advertising
- clear determination of actions to be taken to support charitable and sponsorship of community
- vision and enlightened in terms of sustainable development
- Respect for nature.

A first step in achieving this would be by establishing a clear code of conduct and actual code that sets an example for entities that operate in this area.

A second step would be responsible local radio reporting tool to use social involvement as both financial and non-financial statement.

Also it requires the use of ethical marketing practices both in terms of sales and marketing and advertising practices.

The fourth step is community involvement through volunteerism and beneficial effects generalization that volunteers can have on the radio business.

Promoting a cause, social marketing, and cause related marketing are actions that can be used by local radio to turn into a responsible local radio.

To achieve these objectives a local radio responsible should be closely acting local community and closely aligned with community needs and expectations.

## **Conclusions**

Legal provisions, codes of conduct, management standards are only possible obstacles in front of a corporation's amoral behavior, obstacles that can be passed either through payment of damages or by fulfilling their minimum. But the only thing that can influence corporate behavior is civics and involvement civic citizen in harmonious and safe development of the community to which it belongs.

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## Web services Threat Modeling in a Collaborative System

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### ABSTRACT

In this paper is applied a threat modeling methodology on a collaborative system.

Firstly it will present the current stage of collaborative system security, and then it will be shown how to integrate web services into collaborative platforms. The Threat Modeling methodology is proposed by Microsoft and is a part of the Software Development Life Cycle (SDL). It enables application development team to identify the security threat to a system, evaluate and document those threats and vulnerabilities, determine the risks from those threats, and establish appropriate mitigations. This paper is focused on the web services component. At the end of the paper it will be described the risk mitigation solutions for this collaborative system.

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## Web Technologies and Transitions to Web 3.0

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### ABSTRACT

The information system shall represent the support of the put on and of the simplification of rules and administrative procedures in order to ensure a broad and non-discriminatory public access to public services and also to reduce tariffs for these services, along with the operating costs and the personnel costs.

IT&C market and the major brands have come up with new solutions and new architectures: SOA (Services Oriented Architecture), S+S or SaS (Software as Services) complex architectures, modulation, business solutions designed to streamline information and it's flow, to privilege the citizen access to services, signifying furthermore a careful spending of public money lead to a double vertical and horizontal integration of all services, transactions and applications.

### Introduction

The governance, whichever the level and the enforcement of institutions, it is the most important investor and in the same time a user of information technology. The public administration is certainly crossing trough an important transformation process in the medium and long time term and its availableness in terms of implementation of modern information technologies is the key to this transformation. Since the strategies and public policies define the role of the citizen as an active participant in governance and not only as a simple user, the public administration will have to learn to reorganize their held information for facilitating the transparency and democratic process of the making decision, for the consensus building and for the dialogue and deliberation. The most significant difference which proves the development based on components is that none of the individual components are made in accordance with other component that follows up their integrating services. Each component is grownup in accordance with a general profile so it can be integrated in different contexts and addressed to a larger market segment. Therefore the generality of the components is an efficient action because it allows software manufacturers to cover a wider market and in the same time allows to the buyers the possibility to add features without initial experience. But this is also an issue as these components have not been created having as purpose "the integration".

Taking in consideration all the above, one of the current objectives of public administration is the integration of implemented applications in order to increase their efficiency and the performance of the whole unit. The compatibility is a major issue raised by these component-based systems design. By compatibility, we understand the ability of two entities to interact and this interaction should have a semantically meaning. For the traditional software development any subordinated way newly created is strongly customized according to requirements of the module super ordinate. This module super ordinate incorporates and uses

the subordinated service. Therefore, all modules are compatible accordingly with its own specifications and with parent module specifications. Computer technologies meet these challenges offering various solutions, flexible and efficient solutions Web-based, which provides access to information anywhere and anytime in a secure environment. On the administration level, web services are a valid alternative for consistent developing.

## **Web services**

The ability to switch data is an essential element for success. In the same time at the level of one organization, we find implemented various solutions for solving specific problems and for stoking and making data's switch and therefore the communication are not an easy one between them. Web services have evolved as a practical solution, efficiency in terms of cost, which provides the fusion of that information coming from several applications, exceeding these barriers created by the use of the operating systems, platforms and different languages.

A web service provides a defined set of features to achieve an objective. If in the past a client could use only an application which was installed on a local machine, today you can access an application from any computer, from anywhere in the world by using different development platforms such as C++, Web, Java or Borland Delphi and web standards such as Hyper Text Transfer Protocol (HTTP), Extensible Markup Language (XML), Web Services Description Language (WSDL) and Simple Object Access Protocol (SOAP).

The web services objective is to provide any kind of application to a client no matter what is the platform developed or the architecture implemented, having in view to create an environment where every customer, regardless the device used, desktop or mobile, has the ability to identify a service network and use it as a local service.

Web services are widely used, to facilitate interoperability between different hardware and software solutions, between different computer architectures and application programming interfaces (API). Such interoperability provides immediate benefits that enable faster integration and lower costs of existing services.

Besides, it was mentioned statements for the development of applications by combining multiple services into a single workflow. With this functionality, the applications will be easier to adjust because the services would be added or removed from that stream. Moreover, interoperability will allow application developers to replace a service with another one when technical or business reasons will require this. This development perspective regarding SOA (Service-Oriented Architecture) becomes reality through standardization and technology development concerning web services.

The service-oriented architectures implemented with web services have fundamentally changed the business processes supported by those distributed processing. These technologies bring to the forefront the prospect of services available anytime, anywhere and on any platform. Through web services operators can provide for their users high added-value services, explore new business opportunities, increase their income and may increase the degree of customer retention. There by expanding business opportunities for developers allowing to promote their applications and develop solutions that work in different environments and platforms.

In the present, the intense use of infrastructures and mobile technologies is another trend that facilitates communication and information access from any location at any time. Convergence of mobile technologies and Web services, support the emergence of new business service models and accelerates the development of fixed and mobile internet technologies. Mobile technologies benefit from the advantages of interoperability offered by web services. Interoperable messaging structures lead to reducing time and integration costs, creating premises for the embracement of Web services and opening new opportunities for development.

The growing background of informatics systems brings together various notions and elements. Between them, the code is right the final language for expressing requirements. Languages can approach to the requirements, the tools can help you parse and assemble these

requirements in formal structures but is always necessary the accuracy and therefore will always need the code.

The use of information systems has contributed considerably to streamline business processes. Yet over time, organizations were forced to use more solutions for complete business automation and this resulted in the emergence of limitations or blockages caused by incompatibilities and lack of integration of the solutions used. This applications developed in different technologies has become a standard communication need to be independent of platforms and systems used until then.

Over the years, there have been several attempts, most of which were representative:

- DCOM - Distributed Component Object Model provided by Microsoft
- RMI - Remote Method Invocation provided by the Sun
- CORBA - Common Object Request Broker Architecture provided by OMG
- In this context was necessary to define and impose an open standard that does not belong to anyone and with the following main features:
- The independence of architecture, operating systems, databases and hardware such as PC, large machines or mobile devices
- Which can be used in every domain from simple solutions (P2P - Peer to Peer) to systems EAI (Enterprise Application Integration) and even systems B2B (Business to Business)
- To allow communication between applications running on low speed connections
- To be modular
- Possible solutions listed above do not meet fully the characteristics. In this way has developed the web services (WS) standard. A web service is based on SOAP, WSDL and UDDI. To be able to use these services we need first a method by which to describe and organize data. This method is given by XML.

### **Extensible Markup Language (XML)**

To have an electronic communication it should be used a standard trough it the information can be transmitted or received, plus it should be understood by both parties and systems involved in communication. This need has led to the definition of SGML (Standard Generalized Markup Language). This standard is based on so-called markers, used to delimit the beginning and end information. SGML standard was used for a long time (more than 15 years) by large firms in very specific applications. Along with the development of web technologies is required the use of a similar standard, but to be more accessible and also to preserve its original standard in describing fully the information contained. This is the definition of XML as a derived standard from SGML as it is not belonging to any company and it is an open standard used on any platform and for any type of data transmission, preferable to implement web services.

XML - Extensible Markup Language, is a specification of World Wide Web Consortium (W3C) defining a meta-language for describing data. XML provides the technological basis for Web services technologies. Choosing XML for a project enables a large number of applications and access to a community of experienced engineers. XML enables structured data such as spreadsheets, contact lists, configuration parameters, financial transactions or technical drawings. XML is a set of rules to create text formats that allows data structure . XML makes it easy for a computer to generate and read data, and ensure that the data structure is correct. XML avoids common pitfalls in language design: it is extensible, platform-independent and supports internationalization and localization. XML is fully compatible with Unicode character set.

Like HTML, XML uses tags (words between '<' and '>') and attributes (with form "name"="value"). While HTML specifies what each tag and attribute means and often, how they will appear the text marked with these in the browser, XML uses tags only to delimit the data segment, leaving the interpretation of these data into the application that read them.

Programs that produce spreadsheets, contact lists and other structured data often keep the data on the hard, using a binary or text format. An advantage of text format is that it allows the user to view the file if it is necessary, to view the file without using the program that

produced it the data can be read with other text editors. Also text format makes errors debug easier for developers. Like HTML, XML files are files that users are not forced to read them, but may do so if it is necessary. Compared with HTML, XML rules allow fewer variations. A forgotten tag or an attribute without quotes makes an XML file unusable, while in HTML is permitted. XML specification forbids to an application to try appreciating what the creator wanted to make wrong, to a XHTML file. If an error occurs, the application must stop reading and report an error.

Because XML is a text format and uses tags to delimit data, XML files are almost always higher than binary formats. XML designers have taken this decision for some objective reasons. Text format advantages are obvious and disadvantages can usually be replaced to a new level. Disk space is cheaper than it was in the past. Compression programs can compress the files very well and very quickly. In addition, communication protocols like HTTP/1.1, basic protocol of the web, can compress data under way saving bandwidth as well as binary format.

XML 1.0 is the specification that defines what tags and attributes are. Beyond XML 1.0 is "XML family" is a set of modules (growing) that provides useful services to meet important task and commonly used. XLink describes in a standard way the addition of hyperlinks in an XML file. XPointer is syntax in development, used to identify parts of an XML document. An XPointer is similar to a URL, but instead to indicate a Web document, this indicates a part of an XML file. CSS, Style Sheet language can be used with XML as is used with HTML. XSL is advanced language Style Sheet being based on XSLT, a transformation language used to rearrange, add or delete tags and attributes. DOM is a standard set of functions for manipulating XML (and HTML) in a programming language. XML Schemes 1 and 2 help developers to precisely define the structure of XML files in the format they created. Other modules and utilities are still in development.

XHTML the follower of HTML is an important application XML, with the form of a document. XHTML has many of the HTML elements. The syntax was partially changed to meet XML rules. A format based on XML inherits XML syntax and a constraint in many ways (for example, XHTML allows to use "<p>", but not "<r>"); also adds understood to syntax (XHTML said that "<p>" is "paragraph", and not "price", "person" or something else).

XML lets you define a new document format, by combining and reusing other document forms. Because the two formats can use elements or attributes with the same name, to eliminate confusion, XML has a mechanism called namespace (domain for names). XSL and RDF are examples of formats based on XML using namespaces. XML schema is designed with this support for modularization. This modularity in the definition of an XML document makes possible to combine two schemes to form a third, which defines a combined document.

### **Resource Description Framework (RDF)**

Resource Description Framework (RDF), defined of W3C, is a XML text format that supports resource description and metadata applications such as camera or photo collections. For example, RDF can allow people identification in a photo album (for web) using information from a contact list; then mail client could automatically send an email to these people, alerting them that their photos are on the web (on-line). Such as HTML integrated documents, images, menu systems and forms, RDF are a tool that allows a deeper integration to transform the Web to becoming a semantic web.

Just as people need a convention to determine the meanings of words also and computers need the same thing to communicate efficient. Formal descriptions of a certain category (for example purchase or production) are called ontology and are a necessary part of the Semantic Web. RDF, ontology and representation enable computers to help people work; these are a part of the Semantic Web Activity.

## **Web Services Description Language (WSDL)**

WSDL is an interface that describes in detail the functions that provide a web service. In other words, the WSDL is a description of functions that are provided by SOAP servers starting from the indicated UDDI.

WSDL can be seen as an XML document that describes the routines used in applications, describes the web server location, data form that are received from the communication routines and used parameters. Using a WSDL document can automatically generate classes to access web service. In this way the programmer is relieved from the duty to write these classes manually. A WSDL file is an XML document that describes a Web service using the six main elements:

- Port type - groups and describes operations that are performed by service;
- The port - specify an address for a combination, for example defines a communication port
- The message - describing the names and formats supported by service
- Types - defines data types (such as were defined in XML schema) used by the service for sending messages between client and server.
- The joint - defines the communication protocols supported by the operations that provide services
- The service - specific URL address to access the service.

WSDL document describing a Web service acts as a contract between client and server web service. By adhering to this contract, the service provider and consumer can exchange data in a standardized way regardless of application and platform that operates.

## **Simple Object Access Protocol (SOAP)**

To use a web service is necessary to use a way of data "packing" organized in the form of XML's, to facilitate reading and interpretation by the web server. In this way appeared SOAP (Simple Object Access Protocol) standard that can be viewed as an envelope, containing information. The media does not change from XML, and binary format is unconverted. Are avoided past issues of inconsistency between different operating systems and platforms used.

SOAP is an XML-based protocol defined by the W3C for exchanging data over HTTP, being a simple and standardized method for sending XML messages between applications. Web services use SOAP to send messages between a service and its client/clients. Because all browsers and Web services support HTTP, SOAP messages can be transmitted between applications regardless of platform or programming language. This quality provides web services their interoperability feature. SOAP messages are XML documents that contain some or all of the following:

- The envelope - which specifies that the XML document is a SOAP message that contains the message itself
- Header (optional) - contains relevant information related message, such as the date on which the message was sent on authentication, etc.
- Content - including message
- Error - carries information about an error occurred on the server or client level in a SOAP message

Dates are sent between the client (clients) and Web service using SOAP messages of request and response type, whose format is specified in the WSDL definition. Because both the client and server adhere to the WSDL contract when SOAP messages are created, guaranteeing that the messages are consistent. SOAP protocol is being continuously improved and standardized in order to achieve more effective interoperability.

## **Universal Description Discovery and Integration (UDDI)**

UDDI (Universal Description Discovery and Integration) makes publication easy to search and locate available Web services to be called, is a standard sponsored by OASIS (Organization for the Advancement of Structured Information Standard). Often described as the Yellow Pages of Web services, UDDI is a specification for creating an XML-based registry, presenting information about organizations and web services they offer. UDDI provides organizations a uniform way by which they can present their services and discover services offered by other organizations. Although implementations can vary, usually UDDI describes services using WSDL and communicate via SOAP messages.

UDDI can be a private service within an organization or function as a public service on the Internet. Registering a Web service in UDDI registry is an optional step. To search a web service, a developer can query the UDDI registry to obtain the WSDL for the service that wants to use. Developers can also design their Web services so that customers receive automatic updates on any changes of a service in a UDDI registry.

## **Service-Oriented Architecture (SOA)**

SOA (Service Oriented Architecture - software architecture based on services) is a type of software architecture that involves distributing application functionality into smaller, distinct units - called service - that can be distributed in a network and can be used together to create applications for business . The large capacity of these services that can be reused in different applications is a feature of service-based software architectures. These services communicate with each other by sending information from one service to another. SOA is often seen as a solution to distributed programming and modular programming.

SOA is a flexible, standardized architecture that contribute to better connect the various applications and facilitates the exchange of information between them. SOA unifies business processes by structuring large applications in a collection of small modules called services. These applications can be used by different groups of people both within and outside their company. Typically are implemented functionality that most people would know that service such as for example: completing an application online for an account, view a form or a bank account statement online or make an order of an air ticket online. Main factors that ensure the SOA projects success are evaluating technology options, design, development, delivery and administration. In addition, the need to clearly understand the service-oriented processing must be complemented by understanding their own development environments, the constraints and strategic objectives, to determine the optimal platform to achieve these objectives.

### **Web services benefits**

Between the main benefits, that Web services make available we find:

- integration of data and applications;
- versatility;
- code reuse
- reduce costs

Web services provide the interoperability premises that involve the use of XML technologies that are independent of the developer, platform or programming language and HTTP as a means of transport by which any application can communicate with another. To exchange data with a service, the client requests only the WSDL definition and no need for either party to know how the other is implemented or in what format information is stored. These advantages allow organizations to easily integrate applications and different data formats. Web services are versatile by design. Can be accessed by users via a web-based client interface or can be accessed by other applications or Web services. A client can even combine data from multiple Web services, for example to provide the user an application that updates collections or ERP systems using a single interface-even if the systems are incompatible. Because systems exchange information using Web services, a change in the revenues for example, will not affect the web service. The ability to reuse the code is another positive

aspect of web services flexibility and interoperability. The service can be used by many clients that engage operations provided to achieve different objectives. Instead of creating a custom service for each query unique, parts of service are simply reused, if necessary. All these benefits translate into significant cost savings. Facilitate interoperability means eliminating the need to create custom applications that involve high costs for data integration. Investments made in infrastructure development and systems can be easily used and combined to achieve a high added value. The benefit of using web services is that these represent an independent standard of platform and the programming environment used, and for the programming languages with included support, these automatically occupy themselves of packing/unpacking SOAP messages and the transfer of parameters/results. Thus, the programmer can use the time to focus on the including method function and not on the sending and receiving data.

### **eGovernment and transition to Web 3.0**

The European commission has emphasize which are the main steps that Europe needs to do for responding to the next wave of information revolution, which will intensify in the next years, because of some trends like social networking, the decisive orientation to online services, providing services based on GPS and mobile TV, as well as the fast evolution of using smart tickets.

The Europe lies in a position that allows it to exploit these trends as a result of its politics that support the telecommunication networks opened and oriented to competition, as well as the security and protecting personal information. In the commission reports come up a new broadband performance index which compare the performance from a national level as regards of key elements like connection speed, price, competition, and the coverage area. The internet of the future will radically change the society where we live. The Web 3.0 concept signify availability anytime and anywhere for the business and social environment, using the secured and fast networks. Means the end of differentiation between fixed and mobile lines. Webs 3.0 announce a significant increase in using digital technologies until 2016. The Europe owns the know-how and the capacity at the network level to accomplish this transformation. The users from Europe have access to the improved and much faster internet services: much more than a half of them had access to the broadband internet over 2 Mbps, at the end of year 2007, a speed which is two times bigger than a year ago and which support television over the Internet. The broadband connections cover 70 % of rural population amongst those 27 member states, total coverage reaching 93 %. In the last year the coverage of the broadband connections, in rural environment, in 25 member states, has increased by 8 %, prospects of increasing have maintaining for the current period. This opens the way for a new generation of Internet, and the potential for the European economy is clearly. While a quarter of Europeans have used 2.0 websites in 2007, the business applications for social networking will rapidly evolve. It is also stipulate an worldwide increasing with 15% during 2006-2011, of a business web-based software.

Small applications will need total internet coverage. The concept Internet of things represents a wireless interaction based on the Internet between machines, vehicles, sensors and other objects. The evolution of mobile devices allows the exchange of information or pay online by accessing the internet. It is estimated that by 2015 over a billion mobile devices will support such capabilities.

This context opens up new opportunities for business sector with condition of maintaining the high level of investment in expanding access areas to the high-speed connections and sustaining the work and research. In the announcements of European commission it is specified that the union.

### **Conclusions**

Communication between processes is the key element of distributed systems. This is based on sending messages to a lower level provided by the network. The expression of communication through messaging is more difficult than using primitives based on shared memory available on undistributed platforms.

Modern distributed systems often consist of thousands or even millions of processes spread across a network in which communication is not secure, an example being the internet. Development of applications on a wide coverage area is extremely difficult if the facilities of communication primitive's computer networks are not replaced with something else.

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