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24-26 March
Budapest,
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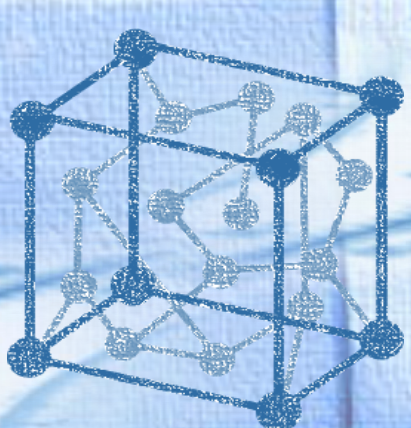

European Scientific Institute

PROCEEDINGS

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Why Architects See Things Differently
An Architectural Approach On Teaching Space Perception

Dana Julean
Senior lecturer PhD architect
Technical University of Cluj-Napoca, Romania

Abstract

Space is all around us, we experience it as shaped into buildings, rooms, tiny enclosures, as well as shaped into public spaces, squares, streets, and as natural landscapes. However, when we look at it, interact with it, walk through it, we all experience it differently. Psychology teaches us that the perceptual process is a very complex mechanism, which is essentially made up of two aspects: "one of which is essentially *figurative*, related to the percepts or images of successive states or momentary configurations of the world by direct and immediate contact, and a second which is essentially *operative*, related to the operations which intervene between successive states and by which the subject transforms parts of the world into reconstructable patterns or schemas." (Hart & Moore, 1973, p. 249). Thus, when looking at space, although we all "see" the same thing, we operate and understand things differently mainly because of our different social, cultural, religious, and geographical backgrounds (Downs & Stea, 1973). Therefore, the present study would like to focus precisely on this aspect, namely why do architects perceive space differently than the ordinary passerby?

Keywords: Architecture, space perception, architectural higher education

The Perfect Building

Architects and builders have been obsessing for centuries over the perfect proportions of their buildings. Going back as far as the ancient Greeks, the composition of the facades, the language of styles, and the rules of architectural orders, defined through the architects' approaches, have always looked for and argued over the "correct" way of conceiving architecture. For example, the golden ratio is probably the best-known example of the mathematical search for right proportions in architecture. Nowadays, there are specialized publications, on-line platforms, courses, conferences, discussions and prizes which all debate, on a highly

professional level, the aesthetics of the most recently built architecture. However, all of this is done within the profession - namely architects judge other architects' buildings, accomplishments, spatial experiments and so on. Whenever the architects take part in discussions, which involve people outside their circle, there always appears this one question: why do not ordinary people appreciate "Architecture" with capital A? Moreover, why do architectural professionals seem to have such radically different opinions on what makes "good architecture"? (Vais, 2015, p. 97)

Architectural Space Perception: A Distorted Point of View

This is a very common subject among architectural psychology studies. For example, David Halpern (as cited in Vais, 2015, p. 98) recounts that he himself contemplated the idea of becoming an architect, until, as a senior student in Cambridge, he took part in an experiment which investigated this aspect. The experiment used groups of students majoring in different fields (arts, architecture, and natural sciences). They were asked to view a set of pictures, which illustrated faces of people or buildings. The aim of the experimenters was to establish how different educational backgrounds alter the way "beauty" is being perceived. Results showed that all the participants, regardless of their background, had a very similar view on which features make an attractive face. However, in the case of buildings, as expected, there was a very clear distinction between the answers given by the architecture students and the rest; furthermore, the distinction grew, within the group of older architecture students, thus proving the fact that architectural education *distorts* the perception of beauty of the build environment. So then, why do we do it? Why do we train architects to "see" buildings differently?

Architects, when compared to others, have a particular point of view, namely they do not only interact with buildings on a daily basis, but they also have *to build* them. Designing a building implies a comprehensive knowledge of the particular building type one is developing; it also implies knowing how to ask the right questions regarding the different scenarios in which the building can be used, and also answering them! Thus, when looking at a space - be it a building, a public space or even a city - an architect will not see it just for what it is, but they will also try to figure out how it was build and how it works (Arnheim, 1977). Hence, even on a leisurely walk through a park, an architect could deconstruct the space around them and "perceive" physical or virtual features, which define a certain *place*, within its broader space (Norberg-Schulz, 1980). For example, a simple bench placed under the branches of a tree, emanates a different character than the space in its immediate vicinity. Being able to observe such subtle differences of physical or virtual boundaries, helps architects when

they design themselves space. Therefore, from an educational point of view it becomes clear that architects *need* to be trained differently when perceiving space.

From Architectural Practice to Architectural Theory

Architectural theory, as a discipline, deals precisely with this issue. It analyses, deconstructs and studies the built environment and then it issues theoretical concepts, which (try to) explain what makes buildings/spaces a success or, on the contrary, a failure. Of course, architectural theory itself ends sometimes misjudging the facts and draws the wrong (or at least incomplete) conclusions, which, further on, produce bad spaces (Tuan, 1974; Tuan, 1977). However, architectural theory remains quite an important instrument in educating and shaping architects. In this regard, there are several texts referencing spatial composition and perception. Probably the most famous one is Francis D. K. Ching's *Architecture - Form, Space, and Order* (Ching, 2007), although there are a lot of fundamental texts going all the way back to Rudolf Arnheim's *Dynamics of Architectural Form* (Arnheim, 1977) and the more famous *Art and Visual Perception - a Psychology of the Creative Eye* (Arnheim, 1954). Moreover, virtually every architectural school has its own theory department, whose research focuses, on a smaller or larger scale, on some aspect of how space is or should be perceived.

There are some quite interesting independent studies conducted by practitioners or theoreticians regarding this issue. For example Luigi Moretti, an Italian architect and theoretician active during the early 1970s, did some quite unique research in the field of space perception. His studies focused on the moment when the individual observes and starts *to perceive* and *comprehend* the space surrounding them. His curiosity on the matter made him feel the need to "freeze" the space he was examining, turning it into a solid, which could be handled and analyzed in detail. Thus, Moretti made several models of the interior space of the buildings he was researching - models of subjective and affective spaces. The architect used in his description terms like plasticity, material density and even *chiaroscuro*, in order to characterize the "intellectual aspects of material in its concrete physicality" (Moretti, 1974, p. 124). The different sequences of architectural space - solid, void, narrow, broad - are translated into an almost mechanical manner; namely, Moretti perceives the various types of pressure space exerts upon the visitor. In his view, space turns into matter; it has a presence of its own, detached of the building materials which enclose it - this "rarified substance" being able to communicate with the individual on a perceptual level. Moretti, by modeling the immateriality of space, manages to determine a way of identifying, preserving, and analyzing the spatial characteristics, the

order and the reference system which are established between the subject and the space surrounding them - an affective bond, labeled by Tuan as *topophilia* (Tuan, 1974).

And From Architectural Theory to Architectural Education

This shift of perspective, which implies shaping and fostering *an architectural* manner of perceiving space, happens gradually, over time. From an educational point of view, it is difficult to define the perfect method of accomplishing this. However, such a process should rather aim at establishing a goal - a type of attitude, a procedure or a methodology - so that students are encouraged to develop their own path, their own rhythm of assimilating and applying a more or less empirical way of gathering the information. Learning *about* space, learning *how to create* space is a process which is based on the power of example: observing its physical features, the quality of the light, the different points of view, the path, the climate and the geography of the terrain, as well as its sensorial and cultural features - including the manner in which different individuals manage to walk through and interact with that particular space.

Thus, the aim of the Theory-Methodology course, taught during the second year of studies at the Faculty of Architecture and Urban Planning, the Technical University of Cluj-Napoca, is to discuss, in a contextualized manner, two main subjects: *the composition* and *the perception* of space. First, the course is trying to identify, analyze and explain basic compositional aspects regarding *spatial morphology* - namely primary elements such as *point*, *line*, *plan* and *volume* - and *spatial syntax* - compositional and organizational principles. Then, the course proposes an integrated and transdisciplinary approach regarding the process of *perception*. Thus, the analysis slides towards broader fields, such as psychology, sociology, anthropology and geography, explaining concepts such as *personal space*, *wayfinding*, *mental maps*, *territoriality*, *non-place*, *heterotopia*, etc. Finally, the course intends to establish a clear connection among the three layers of space: *a space which is conceived*, *the physical space of the reality* and *a space which is perceived*. Consequently, a fundamental infrastructure is being established, so that different examples of architecture can be critically approached and discussed.

Projected Space, Produced Space, and Perceived Space

The novelty of the approach consists in the fact that, beside the familiar discussions regarding *the composition of the space* (Ching, 2007), the course tries to teach the students that they should also take into account information which comes from related fields of study, such as psychology, sociology or culture theory. Although, there are quite a few worldwide

famous examples of programs studying environmental psychology (University of Surrey, 2016), of independent research structures analyzing different aspects of the relationship between architectural space and its users (Academy of Neuroscience for Architecture, 2016), or of structures which focus on involving the community in the actions they take (The Center for Human Environments, 2016), this course is trying to focus mainly on the issue of *space perception*. Thus, taking the three layers of space as a starting point, the course is trying to break them down into fundamental units.

The first one, *the projected space*, is the space that the architect imagines and conceives. It is a virtual space, which is not built yet. However, it is a type of space which is worth studying, analyzing and discussing. The only way the architect can depict this type of space is through drawings, plans, models, through 3D animations, and, lately, through virtual reality. Perceiving such a space is difficult, especially for untrained eyes.

The second type of space, *the produced space,* is actually the physical space, the built space in all its instances - micro-architecture, temporary architecture, spatial experiments, architectural object, or urban space configurations. Basically, it is what one calls *the built environment.*

The third type of space, *the perceived space*, is the space as it is understood by its user; a perception which presupposes cultural, psychological, philosophical and/or social differences. Thus, in order to analyze the complexity of this last layer of space, the architect needs *to contextualize* the impact of the built object within its historical, cultural, social, philosophical and/or geographical environment. In order to be able to understand what others might think of the spaces one creates, one has to understand *how* the others *perceive space*.

The Breakdown of the Perceptual Process

Thus, in order to be able to use such complex concepts, the student must first master the manner in which the perceptual process works. Consequently, the course presents concrete facts about how perceptions are formed, basing them on the extensive studies undertaken by Jean Piaget (Piaget & Inhelder, 1956), and , more recently, Irving Biederman's (as cited in Miclea, 2003) studies of recognition by components, or *geons* (geometrical icons), as he calls them. Then, the focus is shifted upon the manner in which the information received at the end of the perceptual process is structured into *mental representations*. Starting out with the *gestalt principles* (Lang, 1974; Levi, 1974; Burnette, 1974), the students learn how *mental maps* are formed (Lynch, 1960) and how people are able *to navigate through space* (Stea, 1974). *Wayfinding* is a concept, which mainly relies on memory and its ability to re-represent space: "Memory begins for a person when she has an experience and perceives what happens, where it

happens, who is there, what her role is in the experience, and the feelings she has at the time. Her brain disaggregates elements of these perceptions allocating each to a different part of the brain. The mood of the event goes one place, the colors of clothing another, and the size of the space a third. Faces of participants, action terms (verbs), nouns, and objects all go into different areas of the brain, and the way she traveled to or from the place (her cognitive map) into still another." (Zeisel, 2006, p.146)

The students responded rather well to this approach and several of them have been quite interactive during the discussion sessions following each course. Some of them even reported taking into account the principles studied during the course when designing their own projects for the Design Studio.

Conclusion

A rather elementary conclusion is that when one judges architecture, one actually speaks about *perceiving architecture* and not about architecture *per se*. After describing and analyzing the complexity of the perceptual process, it becomes quite obvious that, before an evaluation or a discussion of architectural aesthetic principles, the student must understand that the success or failure in architecture is a matter of *perception.* Such a discussion on perception, form an architectural point of view, is meaningful for several reasons.

One of these is simply the way in which one perceives the architectural object in front of them. Namely, what the user *perceives* when they try to identify the manner in which a space should be navigated, the attitude they should have towards the physical environment, whether they identify or not the meaning of the space. It is an intimate, personal and immediate relationship with architecture - in which, of course, the aesthetic factor plays an important part -, but which depends mostly on one's knowledge, system of decoding and interpreting meanings, preconceptions or rituals.

Architecture is more than just a spatial or volumetric composition, architecture can *design spatial perceptions* and, at the same time, it can be judged as being a success or failure when the object - the product of architecture - is *perceived* in its context. Thus, we have reached the fragile relationship between *designing* and *dwelling* space, between *imagining* and *creating* space perception and *practicing* perception in the real, immediate space.

The complexity of the architectural theoretical analysis resides in this two-way relationship: theory is, on one hand, critical - analyzing and interrogating the physical reality, the immediate space or architectural product - and, on the other, it tries to come up with solutions - methodologies

that are fundamental to the designing process in order to make a difference in the outcome of the final architectural product. Practically, one can trace theoretical endeavors, which are concerned as much with the creative process - that precedes the actual construction phase -, as they are with the effects produced by the implementation of the architectural object - the post occupancy phase.

However, the present study managed to answer half of the question, namely *why architects see things differently*, nonetheless, the second half of the question, *why architects have a different idea of what makes a building beautiful*, remains still unanswered. Thus, the subject is open to further research.

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On Teaching History Of Architecture In Higher Education
Or How To Use Sir Banister Fletcher's *A History Of Architecture* For A 21st Century Course In Architectural History – An Overview

Dan-Ionuţ Julean
Senior Lecturer PhD architect
Technical University of Cluj-Napoca, Romania

Abstract

Teaching history of architecture to young students may be the most challenging duty for a member of the teaching staff within an educational institution that prepares future architects, in (for) the 21st century. An explanation would be the fact that *History of Architecture*, as a compulsory subject of the educational curriculum is often regarded as being obsolete and useless. Nowadays generations regard the present as the only conditioning matter for future. Therefore, with few exceptions, the history of architecture is completely forgotten, despite the fact that the theory of architecture sets certain turning points or counterpoints, related to the past – e.g. *genius loci* (Norberg-Schulz, 1979). Usually the design studios, where they "knead" and collate lines, textures, colours, materials, and images, attract students a lot. They work with space and they create space. But what happens beyond the drawings? What is behind rules and regulations, building-types and facilities, walls and windows? Architecture is *where people dwell*… (Heidegger, 1975, pp. 221-229). On the other side of the present and future of architecture, lay centuries of history of architecture that usually remain unrevealed – covered in oblivion or totally neglected. That is why, the role of innovation and originality is highly recommended when teaching history, the history of architecture in particular. Thus, this paper focuses on new approaches in architectural higher education, as the result of the courses and seminar classes implemented by the author at the Faculty of Architecture and Urban Planning of Cluj-Napoca.

Keywords: Architectural higher education, new practices, courses, seminar classes

Refusal of History in Contemporary Romania

Despite the devotion of the academic teacher to his students or to his professorship, there is this great distance set between past and present, measured in time: this distance makes the difference and draws a final break line – quite thick and scarcely dashed.

Things become harder when you have to do with students that accumulated certain gaps during their high school formation – and this is a cruel reality, common in contemporary Romania, after the 1989 Revolution. The fall of Communism brought dozens of important changes in the political, economic, social, cultural and religious life, with strong impact on the Romanian society.

Particularly, the Romanian educational system and the national educational curriculum have suffered enormous changes – successive reforms were undertaken (for more information see: Ministry of Education and Research, 2001; Ministry of National Education, 2014; Romanian Government, 2015). On one hand, an explanation would be the continuous endeavour to create a new, different, and better democratic educational system, trying to replace the strict, subjective, and unilateral one, subordinated to the ruling politics of the Communist party, with the teaching staff being highly supervised by the local Party Committees. On the other hand, there is *the repulsion to learn history*, because for almost 45 years, Romanians, as in other countries under the Iron Curtain, had to learn a highly controlled and imposed history, according to the history and vision of the Communist Party, pointing out the role and glory of the *beloved leader* and of *the Party*.

Since the downfall of the Communist regime, the allegiance to the head of state and Communist Party leader Nicolae Ceauşescu, as well as the allegiance to the ruling Romanian Communist Party became a matter of hate and disgust. It still dominates the contemporary Romanian society that continues "to investigate", after more than 25 years, *the crimes of the communism* and *the enigma of the 1989 Revolution* – everyone can watch this, maybe more than three times a year, on their own TV. Therefore, the public disgust and accentuated carelessness over the history of Communism in Romania, doubled by the sad ignorance of the young people to the recent history, turns into a general sense of unconcern, which makes Romanian teenagers highly unmotivated in the process of their intellectual formation. Unfortunately, to this effect, the national curriculum for pre-university education and the official manuals have a significant impact. Particularly, recent history is treated superficially: the Communism in Romania represents only a small chapter that links the end of the Second World War with the post-revolutionary period. In this way, about 45 to 50 essential years are "missing" from the high school graduates' knowledge. Moreover, only

recently, the Baccalaureate exam curriculum included a chapter on ideologies and political practices in Romania, during the 20th century, including concepts on Stalinism, national-communism, and anti-communist dissidence, also with a view on Romania's position during the Cold War. Therefore, we are not speaking at all about school dropout, but on the contrary, during a long period of state supported education, many pupils and then students accumulate and manifest a crass lack of attitude, in the broader context of a lack of knowledge on their selves, as individuals with personality. Not surprisingly, this attitude is in fact also a result of the rejection of the idea of the controlled social and educational Communist politics, reflected in their parents' formation.

Consequently, *the refusal of history* means *the refusal of everything connected to the past*: events, personalities, architecture, etc. Life in the communist block has ejected the *usages du monde* (Staffe, la baronne, 2012 [1891]), proper to capitalist democracy and great expectations of the bourgeois life. *Savoir-vivre* has become an uncertainty. Despite all these, lately, it seems that the Romanian society highly esteems the old values and their exponents (old-fashioned intellectuals, aristocrats or other former *class enemies* that survived Communism), generally trying to re-evaluate its position and to reconnect to its roots. Moreover, it should be underlined that, on a scientific level, there has been an abundance of research done regarding the subject of "corrected" history, architectural history, and even Communist architectural history, although a gap remains between the scholarly perception and the view of the common society. Nowadays, this issue has been highly debated in the mass media. Recent approaches, like the campaign entitled "The right to access memory. The museum of Communism in Romania" ("Dreptul la memorie. Muzeul comunismului din România"), try to find out how teenagers and young people can be motivated to be interested in the history of communism. The campaign, produced by the Romanian Television Company and the Institute for the Investigation of the Crimes of Communism and the Memory of Romanian Exile (IICCMER – Institutul de Investigare a Crimelor Comunismului şi Memoria Exilului Românesc), was active between 8th of May and 26th of June 2015 and had a great public impact.

In the recent years, the role of *continuous education* and the need of *national youth policies* has been highly emphasized (Marinescu, 2010). The young are especially vulnerable, when, after the end of puberty (between the age of 12 to 14), the gradual maturation of physical and mental functions of the body develop and teenagers prepare to become adults, responsible for the consequences of their actions (psychological maturity ends at the age of 25-26 – Groza, Vaina, Marcu & Ştef, 2010). To this effect, *the state policies* are very important – currently, in Romania, there are a series of new strategies

and laws, which support the national priorities in the education system (Ministerul Educaţiei Naţionale, 2016).

Nowadays, young Romanians confront a challenge. They seem to be swimming between two waters. On one side, there are the waters of past regarded as something to forget, because they are supposed to do so – apparently, there are things which nobody is interested in. On the other side, there are the waters of the past regarded as something to forgive and most of all to accept – in doing so, they have to admit and assume a history that has many things to say and, as well, to recover. In addition, the perspective on *old architecture*, seen as a remnant of the past, is also twofold. One reflects the obsolete image of the past, which thus can be ignored – it is the musty architecture that has fallen into disuse, due to its outdated character – its artistic, cultural or historic value is not important – it means nothing. The other reflects the values of the past, which have to be understood and recovered – it is the architecture that has to be restored, rehabilitated and / or reconverted, enhanced and promoted; it represents testimonies of a past which has to be re-acknowledged. Therefore, in the light of all these, teaching history of architecture in higher education is quite a challenge, most of all if we are speaking about *ancient or medieval architecture*.

Challenges of Teaching History of Architecture in Higher Education:

In the broader context of contemporary education, the *permanent education* reflects a *continuous character*, *a formative character*, *an overall character*, *a dynamic character*, and *a flexible character*, looking to adapt, evolve, and integrate parallel to the development of society (Ionescu, 2003, p. 405). In Romania, architectural studies in higher education extend over a six-year period. At the Faculty of Architecture and Urban Planning from Cluj-Napoca students study the history of architecture in the first four years: ancient and medieval (1st year), Renaissance and Baroque (2nd year), nineteenth century and twentieth century (3rd year), history of architecture in Romania (4th year). On this line, as titular of the courses of *History of Ancient Architecture* and *History of Medieval Architecture*, for the first-year architecture students, I have a serious responsibility, which involves their future affinity both with architectural theory and with architectural practice. My own experience, as an alumnus of the Faculty of Architecture and Urban Planning from Cluj-Napoca, has challenged me to create a different view over the contents of these two courses in the history of architecture, trying to emphasize more the practical side of the subjects, rather than the theoretical one. Hereunder, I present the result of my endeavor, taking into account that Sir Banister Fletcher's *A history of architecture* represents a metaphorical extent of the theoretical approaches in relationship to the applied exercises.

The structure of both courses follows *the same approach*. The *theoretical subject* (two-hour course per week, fourteen weeks per semester) proposes to emphasize the diversity of the architectural phenomenon related to its geographical, historical, political, economic, cultural and religious context. At the same time, it argues the necessity of understanding the meanings and interpretations of the architectural phenomenon (practically and didactically, using technical and specific terms / notions), focusing on the reality of its applicability. Thus, each course is followed by *practical work* – on the field (two-hour "detective sightseeing" every two weeks), at school (two-hour seminar every two weeks), and at home (one-hour study every two weeks). For each individual work / project, a student has two seminar classes. While presence at the courses is recommended, presence at the seminars is mandatory. Students are permitted to make up only one missed seminar at the end of the semester. The preparation for the final exam needs about twenty-four hours of individual study. The final exam consists of a one-hour test, with fourteen questions, with a table-layout in A3 paper size.

The History of Architecture is a basic discipline for future architects, being formative, as well as informative. The study of the evolution of architecture throughout Antiquity and the Middle Ages, pointing out important moments in the history of the civilization, is seeking to explain the different manifestations, expressions, and representations of the architectural and artistic instances, in accordance with the economical means, the technical development, the forms of social organization, religious beliefs, and life philosophy.

The main goal of the disciplines is to develop competences and knowledge specific to the architectural profession. They do so by understanding the phenomenon and the architectural process, which unfolds starting from Prehistory up to the end of the 15th century. The issues of the discipline are contextualized, a fact which is essential for *understanding the following periods of the history of architecture*. *The specific goals of the disciplines* are both theoretical and practical, following the content of each course.

The *History of Ancient Architecture* is a course structured into four main parts, pointing out:

- an introduction to the study of the history of architecture;
- the prehistory (the rupestral art – Paleolithic, Mesolithic and Neolithic; the megalithic civilization);
- civilizations of the Ancient Near East (the architecture of Ancient Egypt and the architecture of Mesopotamia – Sumero-Akkadian, Babylonian, Hittite, Assyrian, New Babylonian, and the Achaemenid Persian Empire);

- Mediterranean civilizations (Minoan and Mycenaean, Greek, Etruscan, and Roman).

This course emphasizes the importance of various aspects of the classical inheritance of the Greco-Roman world and its characteristic contributions transferred to the modern European civilization.

The *History of Medieval Architecture* is a course structured into four main parts, pointing out:

- the premises of medieval art and architecture
- the Early Christian art in the Roman Empire;
- the Eastern Roman Empire; the Byzantine Empire (the byzantine style; the inheritance of the Byzantine Empire);
- the Middle Ages in Central and Western Europe subdivided into two parts: art and architecture of early feudalism or Early Middle Ages (5^{th} to 10^{th} century – the fall of Rome and the Pre-Romanesque *style*) and the art and architecture of the developed form of the feudal society – High Middle Ages and Late Middle Ages – the Romanesque *style* (11^{th} to 13^{th} century) and the Gothic *style* (12^{th} to 16^{th} century).

The exposé is both theoretical and practical, by which it means to reveal the importance of every architectural achievement as a step forward for the evolution of the modern man. Therefore, using the video projector, each presentation is structured according to *a recurring lesson plan*, showing, if it is relevant some *contextual generalities*, *time line / periodization*, the study and analysis of *specific architectural forms* and *building types*. This helps the students to get used to a structured way of thinking, encouraging each of them to develop a particular / individual attitude / opinion / definition, toward each architectural notion, object, building type, etc. Put in this light, it also enhances a preliminary spatial perception and the challenge of working with proportions, while drawing at the seminar classes or preparing for the final exam.

Accordingly, the course emphasizes the idea of the permanent evolvement of architecture according to the general development of politics and society, pointing out the differences or similarities, and the most important steps achieved in each period, determining the specific architectural typologies and building types, elements of technical language, cultural notions, specific architectural forms, architectural layouts, materials and building techniques.

All these being said, one should notice that that each student has the opportunity to form / elaborate the optimum visual "synopsis" of the presented material. This ensures the future architects also draw up layouts or other technical architectural designs, with a view to make the most of the resources provided (books from the University Library, drawings and other scanned digital material, etc.). The practical work does not encourage

meticulously accurate representations / drawings, but rather sees that students find out that the study of the history of architecture can be challenging, sometimes like a mystery investigation, being rather a tool for planning, sketching, and designing, both theoretical constructs and abstract depictions. The recommended bibliography list includes Romanian specialized dictionaries (Popescu, 1995, 1998), architectural or cultural history books (Curinschi Vorona, 1976, 1982, 1986; Lăzărescu, Săsărman & Voiculescu, 1971; Drimba, 1997; Fleming 1983), together with foreign works like Sir Banister Fletcher's *A History of Architecture on the Comparative Method* (Fletcher, 1896), Wilfried Koch's *Baustilkunde* (Koch, 1994), John Mansbridge's *Graphic History of Architecture* (Mansbridge, 1999), and Rolf Toman's albums on *The Art of Gothic* (Toman, 2004) and on the *Romanesque : Architecture. Sculpture. Painting* (Toman, 1997).

The practical work, conducted during the seminar classes, divided in three units, supposes that each student will elaborate individually a three-part illustrated personal vocabulary, with professional terms – about thirty per unit. Through this approach, students will assimilate basic and key concepts or notions – be they specific to the history of architecture or to the profession of architect. Each unit is composed by a two-hour study visit and a two-hour drafting session at the Faculty. The task for each session is presented during the first seminar class – respectively the first study visit. Study visits focus on small-scale architectural objects (*e.g.* tombs and family vaults in the Central Graveyard of Cluj-Napoca) and on medieval buildings accessible to the public on various levels (like the remnants of the city defensive system or the Reformed Church on Kogălniceanu Street). Thus, students can literally touch the architecture notions they are learning. Then, they have to find and photograph other examples, on their own – preferably, they have to identify the buildings which concentrate most of the given elements / terms. For each drafting session students have to prepare a collage with their own study photographs and to consult the specialized dictionaries (about one hour home study). At the Faculty, they draw and write detailed explanations as requested. The drafting layout is a A4 size notebook containing hand-made drawings, technical explanations, and personal observations. Therefore, the practical works aim at an applicative goal, namely identifying and detailing, for each term, an example of historical architecture in Cluj-Napoca, possible comparative studies or, as is the case, personal observations on the matter. The final target is *to understand the applicative and formative role of studying the history of architecture*.

Eventually, the courses and the seminar classes aim to establish *elements of a specific professional knowledge*, which will offer the students the possibility / ability:

- to recognise the main monuments of the studied period;

- to identify specific architectural features of the studied period, respectively to group various buildings according to specific criteria (historical period, cultural and geographical area, and stylistic aspects);
- to understand the evolution of the architectural phenomenon of the studied period (relating it to shape, structure, material, ornamentation, meaning, symbol, image, social-political-cultural-religious context);
- to establish comparisons among different architectures of the studied period, regarding construction materials, construction methods, architectural forms, and building types;
- to use professional notions and terms in an adequate context;
- to anchor, generally, architecture and, in particular, the architectural object in the adequate social-cultural-political-economic-geographical context.

Conclusion

Both disciplines offer a broad perspective upon the context of the evolution of the civilization and society throughout the specific centuries, thus essentially contributing to the development of *a professional cultural and evaluative filter*, and *to the understanding of the transdisciplinary nature of architecture*. The process of teaching provides student-centered learning experiences. The process of evaluation (final exam + seminars) is objective and concentrates on the students' ability to synthesize the information gained (through schematic drawings with concise explanations).

Following these courses and preparing their own hand-illustrated vocabulary notebook, students acquire a series of skills, meaning that they will know how to use professional terms, a personal cultural filter of professional values, specialized books or documents, plans, sections or other architectural details not only specific to the studied period or to a certain geographical-cultural environment, but globally applicable.

Transversal key competences for lifelong learning include understanding the transdisciplinary nature of architecture, the development of a professional conduct related to architectural monuments and other cultural testimonies of the studied period. Thus, understanding and respecting the (cultural, artistic, architectural) values and even the development of some elementary forms of a professional ethics (particularly relevant regarding restoration, rehabilitation or reconstruction works) are provided. This is the result of the applied *in situ* learning and of the systematic process to get accustomed with the historic city, in which students live at least during their six-year study. However, maybe, the main achievements are the shaping of oral and especially graphic communication skills (through professional dialogue, respectively, drawings and sketches focused on form, materials, structure, substance, content, symbol, image).

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The Nexus Between Teacher Professional Identity And Some Socio-Demographic And Psychological Variables

***Predrag Zivkovic*, PhD**
University of Kragujevac , Faculty of Education, Jagodina, Serbia

Abstract

As multidimensional concept, primarly relational rather then substantial, professional identity can be investigated in nexus with socio-demographic and psychological variables. On a sample of N= 284 active teachers in Serbia and in Montenegro, the author examined the prominence of various aspects of teachers professional identity (teaching practice, school and profession, student development, personal development, role anticipation, and commitment to roles), as well as their interrelationship with some psychological variables (self-esteem, self-assessment of their own success, satisfaction with family, and professional satisfaction) and sociodemographic variables (sex, place of residence, years of service, and financial status). The obtained results show that personal development is the most pronounced aspect of teachers' professional identity and that role anticipation is the least pronounced one. Significant correlation has been found between different aspects of professional identity and individual psychological correlates. The results show that there is a possibility of predicting professional identity (the majority of measured aspects) based on a set of psychological predictors. The best predictor in all aspects of professional identity is professional satisfaction. Regarding the nexus with certain sociodemographic characteristics, an interesting finding is that years of service negatively correlated with most of the examined aspects of teachers' professional identity.

The results imply the need for further research of this phenomenon, with the inclusion of a number of psychological and social factors that are directly or indirectly related to the professional identity of teachers.

Keywords: Professional identity, socio-demographic variables, psychological variables, nexus

Background

It is no surprise that the issue of the professional identity of teachers received new attention. Teacher's role is changing from one who conveys knowledge to the one who guides the students *in loco parantis* (Van Manen, 1999). From teachers are expected to adopt a different perception of their roles, develop answers to the question: *Who am I as a teacher*? After decades of hereditary burdens of pedeutology prescriptive training and education of teachers, we become witnesses of advanced interests in the problem and the issue of awareness of how teachers think and reflect on their *self* while organizing personal and professional transformation and identification. Beijaard defines identity as "response to the question who I am; the totality of the different meanings that people ascribe to themselves (tied for yourself) or meaning assigned to the other (identities for others and for themselves)"(Beijaard, 1995, p.34). This definition is associated with the one given of Gecas: "Identity provides the structure and content for the self-concept and self-tied to social systems"(Gecas, 1985, p.739).

Both authors emphasize the importance of self-concept for identity. Nias (1989) concludes that the concept of themselves is crucial for the proper and adequate understanding of how teachers work. In recent literature, there is consensus and agreement on the basic ideas of self-concept. Self-concept is recognized and understanded as "sum of organized information, based on observable facts about ourselves, which includes aspects such as traits, character, values, social roles, interests, physical characteristics and personal history " (Bergner & Holmes, 2000, p.112).

Identity is defined in different ways in the literature and in various fields of science. In some research studies identity is associated with consciousness and a picture of themselves teachers (Knowles, 1992; Nias, 1989). In other research, professional identity emphasis on the roles of teachers (Goodson & Cole, 1994; Volkmann & Anderson, 1998), or concepts such as reflection and self-assessment, as a significant factor in the formation of the professional identity of teachers (Cooper & Olson, 1996; Kerby, 1991). Teacher professional identity is not only related to the impact of conceptualization and expectations of other people, including a widely accepted image in society about what teachers should do and should know, but also to what teachers themselves consider important for their professional work and life, based on theory and practice, as well as their own professional origin (Tickle, 2000).

In the most of the research, researchers consider a professional identity as a continuous process of the integration of personal and professional roles, relatively stable characteristics, beliefs, values, motives and experiences which teachers describe their professional career and work roles (Ibarra, 1991).

Professional identity is not a stable entity, it can not be interpreted as a fixed or unique content (Coldron & Smith, 1999). It is a complex and dynamic "equilibrium" in which the notion of self as a professional balanced with diversity of roles that teachers feel that they should "play" (Volkman & Anderson, 1998). Reynolds (1996) points out that what surrounds personality, what others expected and what it is allowed to influence it, it determines the identity of the teacher. She notes that the position of teachers "landscape" can be very demanding, but also very restrictive.

In defining the professional identity, the concept of "the self" is often combined with other (concepts), and it is generally presented as a real connection. In other words, it is impossible to discuss about self without self-reflection and reflectivity. Through self-reflection teacher connect their experience with their own knowledge and feelings, and is able to integrate what is socially relevant, in the image of *self as a teacher* (Korthagen, 2001, Nias, 1989). The process of formation of the professional identity of teachers is a process that involves the inclusion of a large number of sources of knowledge, such as knowledge of teaching, relationships in communication, as well as specific knowledge in the field of science that deals with the teacher (subject knowledge) (Antonek, 1997). Implicit theories and previous experience as a student teacher should also form part of the corpus of sources.

Many researchers point out the context for the formation of professional identity (Goodson & Cole, 1994; Connely & Clandinin, 1999). It is, therefore, reasonable to assume that the professional identity of teachers depends on the perceptions and understanding of the wider professional community. The aim of the research conducted Sugrue (1997) was to make a review of the most prominent influences (formative, personal and social) on the professional identity of teachers-trainees - the deconstruction of their implicit theories. Its main conclusions are: teacher-trainees are able to define the issues that are related to their professional identity; implicit theories of teachers depend on the personality of the teacher but also from the social context; professional identity of teachers is the most intuitive expression of their personalities (tacit knowledge) and depends on personal theory about teaching and learning. Coldrone & Smith (1999) representing the position in the debate about professional identity that highlights the tension between the role of the organization and structure (which is socially specified). Professional identity can not be fixed nor unitary; he is not a stable entity that people "have" – it is the way by someone invents itself in relation to other people and contexts. Dillabough (1999) deals with the question of the significance of gender in defining the professional identity of teachers (links gender and professional identity and implications). It starts from the premise that there is a history, and even in a sense a tradition, of male dominance in

the political thoughts on education issues. This question is, considered to be the author, central to understanding and explanation of the formation of the professional identity of teachers. The experience of beginning teachers is influenced by what the teacher lived as a student, and this experience strongly influences the formation of their professional identity.

Method

The main objectives in this research were:

1.Assess level of certain aspects of the professional identity of teachers;

2.Determine what is the nature of the relationship between certain sociodemographic (sex, place of residence, work experience, financial status), psychological correlates (self-esteem, self-assessment of their own success, the family satisfaction, and job-satisfaction) and various aspects of the professional identity of teachers.

There were investigated the possiblity to predict various aspects of the professional identity on the basis of the socio-demographic variables.

The sample consisted of 284 teachers (subject teachers) from primary schools in Serbia and Montenegro, the average age of 40.69 years (SD = 8.27). There were 151 females respondents and 133 males respondents, and respondents had the highest percentage of the average financial situation (59%). Most of the respondents are employed for an indefinite time work (69.5%) and has over ten years of work experience (62.5%).

In the study we treated professional identity as a dependent variable, and the independent variables accounted for the different sociodemographic (gender, age, place of residence, work experience, financial status, and employment status) and psychological correlates of professional identity (self-esteem, family satisfaction, job satisfaction and self-assessment of their own success).

1.*Professional identity* is perceived and defined as a multidimensional construct. Professional identity of teachers is defined as a unsubordinative relation of the teacher professional practice (what the teacher does) and professional roles and attitudes (what the teacher did to themselves and others) (Enyedy at al., 2005). It represents a commitment to image and performances of teachers and teaching that have general and personal meaning and sense (VanHuizen et al., 2005), as well as the combination of the actual and allocated identity (how others see us and how we see ourselves) (Dubar, 2000). Given that in this study professional identities were measured using two instruments, there will be analyzed all the aspects mentioned instruments measures.

A) *Professional identity* is operationally defined by the score on a scale from the professional identity of teachers - Teacher Professional

Identity Scale (Cheung, 2008). This is one of the few scales in recent literature and research (psychometric) practices that are designed for the empirical study of professional identity of teachers. The scale was translated and adapted to the Serbian population (Živković, 2012), in a sample of primary school teachers in the Republic of Serbia. After determining the psychometric characteristics of the final scale included 18 items, each having good psychometric properties (Cronbach's alpha 0.87). The respondents give answers on a five-point Likert scale. On 18 items of the scale, by factor analysis (method of principal components with varimax rotation), we get a four-factors interpretable structure which explaine 70.57% of the variance. This result fully coincides with the results obtained by Cheung (2008). Reliability of the scale is high (Cronbach's alpha 0.87). Four subscales that represent factors also satisfy the criteria of reliability (Cronbach's alpha ranging from 0.83 (first factor) to 0.66 (fourth factor). The identified factors are named: *teaching practice, schools and professions, student development and personal development.*

Teaching practice is a subjective experience and evaluation of efficiency in translating the general educational goals of everyday activities in the classroom and school. Refers to the ability to support students to achieve their needs and motivating students to learn.

School and professions represent self-perception of the teaching profession, which is being developed and implemented in collaborative behavior and cooperation with colleagues (respect for differences and diversity in dealing with colleagues, students, and parents).

Student development is an affection and concern for the welfare of students, faith and confidence in the students that they can learn. Teachers evaluate the development of students by analyzes the students' achievements and learning outcomes achieved.

Personal development is a commitment and dedication to the profession and the professional community, continuous professional training and professional development as well as the achievement of setting personal and professional goals.

B) *Professional identity of teachers* has been perceived over measuring of teachers roles-through Teacher Role Identity Scale (Jackson, 1981), a scale to measure the identity of the role of the teacher. Scale form two subscales, commitment roles and anticipation roles. The scale has 14 items, respondents give answers on a five-point Likert-type scale. Reliability of the scale in our sample expressed Cronbach alpha coefficient was $\alpha = 0.69$. To explore the central identity of the author has developed the scale of assessment of the various identities that are retrospective and prospective achievements in the given and accepted roles.

Anticipation roles. First subscale (α = 71) measures the perception of the role of teachers in individual and professional future. Represents construction: identification, biographical identity for themselves, which is characterized by earlier social, educational and professional trajectory and individual perception of the future.

Role commitment. The second subscale (α = 60) measures the perception of commitment to the role of teachers. It represents accepted and assigned professional identification, commitment as professional roles assigned identifications.

2.*Socio-demographic variables* that we considered were operationalized through the response of respondents to the Questionnaire on socio-demographic data, constructed for the purpose of this research. Gender (male / female), length of service (years of service), financial status (very poor, poor, average, very good and excellent) and working status (full time / part time)

3.*Psychologial correlates* we took into consideration were: self-esteem, family satisfaction, job satisfaction and self-assessment of their own success

Self-esteem is defined as part of the evaluative self-image, which is expressed in both positive and negative feelings towards self and indicates the degree to which a person believes himself to be significant and valuable. Self-esteem is operationalized as the total score on the scale of global self-esteem. Rosenberg self-esteem scale that we use to measure global self-esteem, which in the original version was created in 1965 (Rosenberg, 1965) and has since been modified several times and translated into almost all languages of the world, represents the most commonly used scale in the study of self-esteem. Respondents were asked to asses to what extent indicated claims (items) relate to them (1- totally incorrect, 7- completely true). The total score is calculated as the sum of all items on the assessment, a possible range of scores is from 10 to 77. Reliability in our sample expressed Cronbach's alpha coefficient was α = 0.78.

Satisfaction with family represents a subjective assessment of individuals with which to measure the quality of family relationships or family adaptation (Pitman, according to Mitic, 1997). Operationally defined by a score on a scale of family adaptation. Scale of family adaptation (Antonovsky, 1988) measures the overall satisfaction with the outcome of the operation and its overcoming stress is viewed through adaptive family (Pitman, according to Mitic, 1997). The magnitude scale consists of 11 items and measures the satisfaction of the family (the satisfaction of the family and family relations towards the center). Respondents give an answer to the seven-point Likert scale (1 not at all satisfied, 7- I'm totally satisfied). The

possible range of results: 11 – 77. Reliability of this scale in our sample expressed Cronbach's alpha coefficient was $\alpha = 0.83$.

Self-assessment of personal success represents the subjective experience of their own success in life in general. Operationally was determined by respondents' answers to the questionnaire on sociodemographic data concerning a self-assessment of their own success in life (very unsuccessful, unsuccessful, average, successful, very successful).

Satisfaction of a profession is a subjective experience of the quality of connections with other teachers and the profession in general (belonging to the profession and professional community), as well as the status of the profession. (Živković, 2012). This variable is operationally defined through the score on a scale of functions of the identity of teachers - Teachers Identity Functions Scale (Blake, 2000). The scale was used in the study of functions and identities of teachers is satisfactory psychometric characteristics. Skala has 9 items, the respondents give answers on a five-point Likert scale (1-I fully agree, 5 general disagree). Reliability of the scale in our sample expressed Cronbach's alpha coefficient was $\alpha = 0.71$. Živković (2012), just like Blake (Blake, 2000), obtained factor structure of the instrument and proposes the name 'satisfaction with the profession' 'as the most appropriate for this factor.

Findings

Expression of various aspects of professional identity of teachers

Here are the results of description statistics related to various aspects of the professional identity of teachers. These data are set out in Table 1.

Table1. The degree of the expressiveness of the various aspects of professional identity

	N	Minimum	Maximum	M	SD
Teaching practice	284	3	5	4,28	,40
School and profession	284	3	5	4,33	,47
Student development	284	2	5	4,22	,56
Personal development	284	2	5	4,35	,51
Role anticipation	284	1	5	3,34	,56
Role commitment	284	1	5	3,48	,51

As we see, the most prominent aspect of professional identity concerning *personal development* (M = 4.35), immediately followed by one aspect of which is attached to the *school and the profession* (AS = 4.33). At least it is expressed *anticipation roles* (M = 3.34).

Teacher professional identity and some psychological and sociodemographic variables nexus.

Assessed the connection between different aspects of the professional identity of teachers and individual psychological correlates (self-esteem, job satisfaction and satisfaction with family and self-assessment of their own success). For this purpose, we used Pearson correlation coefficient, and the results were shown in Table 2.

Table 2. Connection between professional identity and psychological correlates.

VARIABLES	TP	SP	SD	PD	AR	CR
Self-esteem	-,152*	-,069	-,157**	-,087	-,102	-,096
Job-satisfaction	,386**	,459**	,476**	,421**	-,082	,354**
Family-satisfaction	,077	,180**	,098	,109	-,020	-,022
Self-assessment /personal sucsses	,149**	,025	,059	,101	-,125*	-,222**

Legend: TP-teaching practice, SP-school and profession, SD-student development, PD-personal development, AR-anticipation role, CR-comitment role; * Correlation significative at level 0.05; ** Correlation significative at level 0.01.

There are also discussed nexus beetwen professional identity of teachers (various aspects) and certain sociodemographic variables (age, financial status, and work experience). These results are shown in Table 3 below.

Table 3. Nexus between professional identity and demographic characteristics (Pearson correlation coefficient)

Variables	TP	SP	SD	PD	AR	CR
Age	-,096	-,122*	-,070	-,068	,166*	,044
Material status	-,145*	-,202**	-,194**	-,118*	-,102	-,070
Years of service	-,228**	-,215**	-,236**	-,255**	,199**	,113

Legend: TP-teaching practice, SP-school and profession, SD-student development, PD-personal development, AR-anticipation role, CR-comitment role; * Correlation significative at level 0.05; ** Correlation significative at level 0.01.

We examine the differences in expression of certain aspects of the professional identity and their employment status (part time / full time indefinite period). A significant difference was found only in regard to the aspect of identity commitment roles ($t = 3.077$, $df = 279$, $p < 0.05$). Teachers who have the full-time status have pronounced this aspect of the professional identity, then teachers with part-time job status. In all other aspects of the professional identities were not found significant differences between teachers an employee for an full-time period and part-time term. There were found no significant differences between male and female respondents. The only aspect of the professional identity of teachers which was found differences in expression between male and female respondents is on schools and professions aspect ($t = 2.486$, $df = 277$, $p < 0.05$). This aspect of the

professional identity of teachers is more pronounced in females. In research, attention was paid to the question of the difference in various aspects of professional identity due to the fact that if teachers are going to work as a teacher right after graduating or later (even a year later). The results showed that there were significant differences only in the case of the aspect of personal development ($t = -2{,}121$, $df = 280$, $p < 0.05$). It has been shown that teachers who went to work immediately after graduation are less pronounced this aspect of the professional identity (personal development) of teachers who started to deal with the teaching profession later.

The ability to predict a professional identity on the basis of psychological variables (self-esteem, job satisfaction, family satisfaction and self-assessment of their own success).

The study is the possibility of predicting the value of individual aspects of the professional identity of teachers on the basis of a set of psychological variables (self-esteem, family satisfaction, job satisfaction, self-assessment of their own success). For it is a technique utilized multiple regression analysis, enter method. The results are shown in Table 4.

Table 4. The possibility of predicting different various aspects of professional identity on the set of psychological variables.

	R	R^2	F	df1,df2	Sig
Teaching practice	0,438	0,192	16,315	4; 275	0,001
School and profession	0,486	0,236	21,218	4; 275	0,001
Student development	0,490	0,240	21,729	4; 275	0,001
Personal development	0,431	0,186	15,718	4; 275	0,001
Role anticipation	0,1630	0,025	1,880	4: 275	>0,001
Role commitment	0,400	0,160	13,118	4; 275	0,001

Legend: R – multiple correlation coeficient; R2 –multiple determination coeficient; ** p< 0.01; *p<0.05.

As shown in the table, there is a possibility of predicting the most part of the value of the examined aspects of the professional identity based on a set of predictor variables. Only in the case of the aspect of the *role of anticipation* were proved that this aspect of the professional identity can not be predicted on the basis of the proposed set of psychological variables. The highest degree of explained variance is in the case of the aspect of the development of students (24% explained variance).

The values of standardized regression coefficients show that regard the psychological correlates (and this applies to all aspects of professional identity), job satisfaction is the best predictor (standardized β value for said predictor can range from 0,336 in the case of the aspect of commitment roles, to 0,455 in the case of aspect of student development, whereby the significance t-test is always <0.001).

Discusion and conclusion

Professional identity is only sporadically and inadequately treated as a research variables, while not determined nor his epistemological structure and theoretical nature. In this regard, it was necessary for our research that illuminates the problem from all sides, but taking into account that the operationalization of professional identity and socio-demographic and psychological variables examination nexus. The theoretical and scientific analysis shows that professional identity is justified to study as an interactive phenomenon, because only in interdependent behavior toward personal identification can be achieved. Modern teacher positions, roles, and functions exercised, contextual complexity that characterizes the environment in which realized its gestation, there are all circumstances and tasks that can not be achieved without the development of professional identity. Professional identity is multidimensional concept, which covered different theoretical perspectives on this phenomenon, as well as empirical verification. In this study there are taken into consideration the following aspects of the professional identity of teachers: teaching practice, school and profession, personal development, student development, an anticipation of the roles and commitment of roles. Results of empirical research showed that the most pronounced aspect of the professional identity is teachers' personal development, and, at least, expressed anticipation roles. This finding, apparently contradictory, suggesting that teachers differently assess commitment to the profession and the professional community, professional development and achievement of set personal and professional goals, on the one hand, and completeness of identification as biographical identity for themselves, which is characterized by earlier social, educational and professional trajectory and the individual's perception of the future. All this suggests the difference beetwen identities for themselves and for other identities. When it comes to relationships between different aspects of the professional identity of teachers and certain socio-demographic characteristics, the results were correspondent with previous research findings (Dillabough, 1999, Decors & Vogt, 1997, Cheung, 2008, Živković, 2012). The length of service (years of service) is negatively correlated with most of the measured aspects of professional identity (teaching practice, schools and professions, student development and personal development), with the anticipation of a positive role. It turned out that the years of service decreases expression of professional identity. All that, contrary to expectations, suggesting that the years of service and experience, perception of teachers about the important dimensions and aspects of professional identity change. They probably estimated as less important for the identity form teacher and his professional identity. It is possible that teachers with years of service estimated that some other dimensions of identity are

important for the assessment of professional identity, probably one that we in this work was not measured. When it comes to gender, the data indicate that the professional identity of teachers (in most aspects measured) is not significantly different at male and female. A significantly more prominent aspect of the school and the profession of the teacher female is the somewhat expected result because this aspect of professional identity permeates through co-relation with other colleagues in the profession and cooperation, and adherence is usually more pronounced in the female population. This data is consistent with the findings Živkovic (2012).

There are confirmed a statistically significant correlation between different aspects of professional identity and individual psychological variables (self-esteem, satisfaction profession, family satisfaction and self-assessment of their own success). Of all the examined psychological correlates (all aspects other than the anticipation of the role), teachers professional identity is strongest associated with job-satisfaction. Moreover, there were confirmed the possibility of predicting the teachers professional identity (all aspects except the anticipation role) on the basis of a set of predictor variables, with tht best single predictor of job-satisfaction. Although the degree of explained variance is not particularly high (16% in the case of commitment to the roles of up to 24% in the case of the aspect of student development), the ability to predict various aspects of professional identity of teachers on the basis of a set of tested psychological correlates shows us the importance of paying attention to the research variables, and all in order to strengthen the identity and the creation of healthy teachers. Improving working conditions with occasional monitoring expression of individual psychological correlates, could have a positive influence on strengthening the different aspects of teachers professional identity.

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Contributions To The Study Of The Relevance Of The Web 2.0 On Online Newspapers In Portugal – Case Study

Júlio Costa Pinto, MD, PhD candidate
Escola Superior Artística de Guimarães, Portugal

Abstract

With the present investigation we intend to address the effects that Web 2.0 has had in cyber-journalism. Its interest stems from the fact that the Web 2.0 has contributed to the evolution of journalism as well as to the entire communication process by offering experimentation and interaction environments hence promoting the democratization of information. More specifically, we question to what extent have Portuguese online newspapers taken full advantage of the potential and features of the Web 2.0. The investigation will be divided into two structural parts: analysis of the origin and potential of the Web 2.0 and analysis of the Portuguese online newspapers. Insofar as the methodology is concerned, we have opted for a descriptive approach with a review of the literature on the Web 2.0 contribution towards the evolution of the communication process followed up by the analysis of its main features applied to specific newspapers. The sample comprises five Portuguese daily generalist paid newspapers with online version which also offer a paper version with national distribution. We then proceed to an empirical comparative observation of some of the tools made available by Web 2.0. Subsequently, we raise the question to whether – given the present state of affairs – does it make sense to take a step forward into the Web 3.0 concept as a new communicative practice.

Keywords: Cyber-journalism, Web 2.0, Communication, Technology, Internet

Cyber-journalism as a new model of communication

The course of the present study will stress the ideas of Serrano and Cabezuelo (2009), when they state that newspapers in the era of the Web 1.0 were characterized by using the same contents on their printed version as well as on the online version; as for the Web 2.0 newspapers, they stand out for creating contents that are specific to the web; on their side, the Web 3.0

newspapers are characterized by the socialization of contents, in which the media reveal a strong interaction with the social networks.

In terms of terminology, we will adopt the option selected by Bastos (2005) and Zamith (2008) as for the use of the term cyber-journalism. According to Bastos (2005), cyber-journalism is the "journalism produced for web publications, by professionals seconded to work exclusively on the aforementioned publications". Cyber-newspaper is identified as "a cyberspace publication where journalistic contents are diffused" (Zamith, 2008: 26).

The Internet has revolutionized the way news and information are accessed altering the way of doing journalism. This new social dynamic has consolidated information at a distance in a short period of time. In this atmosphere of constant changes, Fidler named the phenomenon as "mediamophose" (Fidler, 1997: 29), in order to highlight the process of transformation of the means of communication and the permanent adaptation to new media. The increasing utilization of online newspapers is due, to a large extent, to their constant upgrading ability, mass distribution and low cost.

Use of the Web 2.0 in cyber-journalism

Web 2.0 or social Web, has introduced significant alterations on online communication. In terms of newspapers, characteristics of collaboration and participation were enhanced with the incorporation of forums, chats and questionnaires which play a leading role in the space of exchange and dialogue (Tejedor Calvo, 2010). New spaces for interaction were introduced in which the user plays the role of content creator.

Web 2.0 has allowed the consolidation of a more active role to the cyberspace user. This new paradigm, underlying the idea that the user is also the producer of information, has brought with it unavoidable changes to the way we approach cyber-journalism. The capabilities of the Web 2.0 have changed the communication process into a more dynamic one but, on the other hand, the borders distinguishing what is information from what is opinion, were somewhat diluted. This was due to the fact that this almost democratic exercise of content production gave way to a "grey zone", almost laboratory like, which includes innovative characteristics.

In this line of thought, Guallar highlights the creation of an interaction space between media, contents and user, as there already exists the concern for making the guests something more than mere readers once they are invited to not only give their opinion but also to participate in the elaboration of the contents (Guallar, 2007).

Larrondo also points out to the main characteristics of Web 2.0 with great impact and influence on cyber-journalism: hypertextuality,

multimediality and interactivity (Larrondo, 2008). In the same manner, Canavilhas notes that this language includes three features that enable the development of new contents: hypertextuality, multimediality and interactivity (Canavilhas, 2007).

Regarding the potential of Web 2.0 in cyber-journalism, there is a strong consensus among the authors as to the aforementioned characteristics. Nevertheless, some authors point out to other distinctive characteristics, such as instantaneousness (López, 2008: 77) or creativity (Zamith, 2008).

The analytical study of the present research work focuses on the idea that the new language, which allows for the development of innovative contents, includes three features: hypertextuality, multimediality and interactivity (Canavilhas, 2007).

Hipertextuality

Hypertext, as a fundamental element to the organization of information on the Internet, presents itself as a non-linear customizable connection of contents. Through the many links provided by the hypertext, the user has access to parallel and/or additional information that may be presented in several formats. The hypertext has enabled a new way to "read" the information available. Hypertextuality allowed the news to be integrated into a new system designated by inverted pyramid (Canavilhas, 2007).

Multimediality

According to Palácios, the concept of multimediality "refers to the convergence of the traditional media formats (image, text and sound) in the narration of the journalistic fact" (Palácios, 2002). The production of contents has available a wider set of media allowing it to meet the consumers' needs. Each reader makes its own browsing choices. In this multimedia model, online newspapers seek to take full advantage of the Web 2.0 characteristics in terms of the available tools, namely sound, video, photography, illustrations and graphics (Canavilhas, 2007).

Interactivity

Interactivity allows the user to no longer have a passive role, but to become an actor in the process of message construction. In fact, interactivity brought great changes to the communicational model and, for that reason, "the possibility of direct interaction with the news or opinion producer is a strong asset to be explored by web journalism" (Canavilhas, 2001). This new model was only made possible through tools such as chats, forums, comment boxes, surveys, and direct access buttons to social networks like *Twitter* and *Facebook.*

Analysis of the Portuguese daily newspapers

Purpose and methodology of the research

The main objective of this analysis is to address the following question: Are the Portuguese online newspapers taking full advantage of all the potentialities and characteristics of Web 2.0?

The analyzed and studied sample comprises the online edition of each of the five generalist paid Portuguese daily newspapers, which also have paper version with national distribution. The analysis was carried out during the time period comprised between 6 and 10 April 2015. The analyzed newspapers are identified and listed in the following table and in alphabetical order (Table 1).

GENERALIST PORTUGUESE DAILY NEWSPAPERS		
ONLINE NEWSPAPERS	**GROUP**	**URL WEB**
Correio da Manhã	Cofina	www.cmjornal.xl.pt
Diário de Notícias	Global Media	www.dn.pt
Jornal de Notícias	Global Media	www.jn.pt
Jornal i	Sojormedia Capital	www.ionline.pt
Público	SonaeCom	www.publico.pt

Table 1 – Analyzed online newspapers.

Measurement table

In order to validate the observation carried out on the identified sample, we have divided our analysis into five categories, applying to each observation unit a questionnaire with twenty different indicators with values of (1) to "Yes" (0) to "No".

The structure of the measurement table is based on the table by Tejedor Calvo (Tejedor Calvo, 2010), with specific changes and adaptations to the sample and to the goals of the study (Table 2).

MEASUREMENT TABLE	
Dialogue tools	1. Forums
	2. Comments
	3. Surveys
Creation and content management of the 2.0	4. Blogs
	5. Photos
	6. Audio
	7. Video
	8. Infographics
	9. Wikis
Contents 2.0	10. RSS Readers
	11. Podcasts
	12. Movable contact services
	13. Labels
	14. Social Markers
Direct involvement of the users	15. Creation of "my" newspaper
	16. Customizing of the home page
	17. Tools for voting
	18. Citizen journalism
Other social networking services	19. Social networks
	20. Researchers 2.0

Table 2 – Measurement table of categories and of indicators.

Global results

After applying the measurement table to the selected sample, the percentage results shown on Figure 1 were obtained.

In a general manner, the dialogue tools (forums, comments and surveys) have found a satisfactory presence in all analyzed daily newspapers (67%), except in the case of *Correio da Manhã* (33%).

In terms of creation and content management of the 2.0, for which a wide range of indicators (blogs, photos, audio, video, infographics, wikis) was analyzed, the results which were found are almost uniform (67%), as only *Jornal I* presents slightly less positive results (17%).

After inquiring about the 2.0 contents, namely RSS readers, podcasts, movable contact services, labels and social markers, it was observed that these were not actually boosted, since *Jornal I* shows a result of 40% and the remaining newspapers a result of 60%.

As for the direct involvement of the users, in which the creation of "my" newspaper was observed, the customizing of the home page, the tools for voting and citizen journalism, the overall results reveal that it is an underrated category by the Portuguese online newspapers. Despite the unfavourable results in this category, the *Jornal de Notícias* has a presence of 50%, while the *Correio da Manhã* and *Diário de Notícias* have a representation of 25% in this category, and no element of the public's direct participation can be seen on the newspapers *Jornal I* and *Público*.

As for other social networking services in which the presence of social networks and 2.0 researchers was observed, the outcome results were very positive.

In view of the set of the exposed and undeniably essential categories in the newspapers of the Web 2.0 era, it is observed that the dialogue tools are the most used means by newspapers to interact with users but it is worth noticing that they do not make the most of all their potentialities. On the other hand, it seems evident that the connection to social networks is one of the characteristic tools of the Web 2.0 that presents a most prominent role.

It is also interesting to analyze the investment that newspapers carry out on dialogue tools compared to the near absence of direct participation mechanisms for users. It may hereby be derived as a conclusion that, in practice, they occupy the same room in the relation between information and the user and that, eventually, they may supersede it by serving the same purpose.

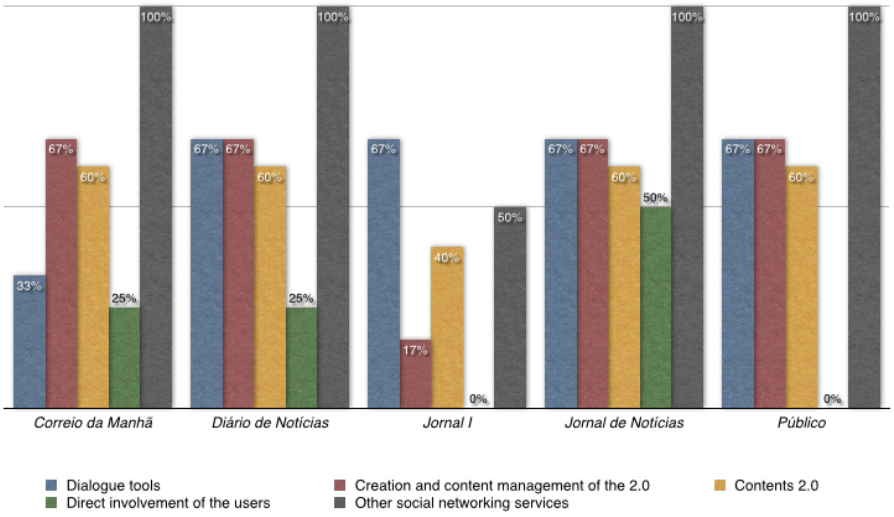

Figure 1 – Graphic of parcelled results per category.

In general terms, it can be stated that the sample shows positive results regarding the use of the Web 2.0 potentialities (Figure 2). However, it seems clear that there is still a way to go in order to enhance all the available tools.

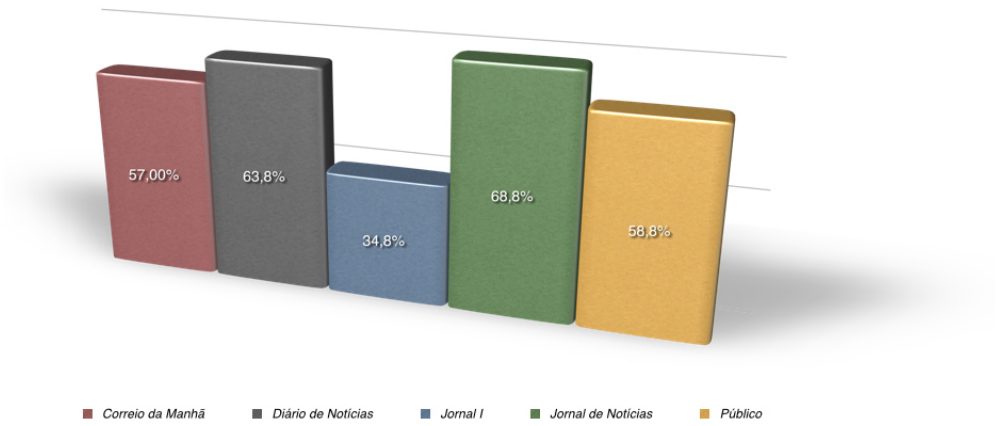

Figure 2 – Graphic of global results per newspaper.

Conclusion and new perspectives

In global terms, we can say that the Portuguese generalist daily online newspapers, while attentive to the potential of the Web 2.0, do not yet fully exploit all the elements at their disposal. This statement is supported by the results exposed following the application of the aforementioned measurement table. However, despite the partial character of the study carried out at present, it seems that an evolution concerning the results presented by the comprehensive study conducted by Zamith was verified.

It seems important to consolidate the main characteristics of Web 2.0 applied to cyber-journalism at a time when all is ready for a step further to be taken: the investment on the Web 3.0.

As it had happened at the time of the emergence of Web 2.0 there is no general consensus on the concept of the Web 3.0. On the Web 3.0, or Semantics Web, the cyberspace, besides including information, provides knowledge. That is to say that the information presented on a virtual space, namely on an online newspaper, does not emerge in a descriptive manner, there exists the intention to provide explanation and clarification of the contents "in order to turn them into knowledge, which, mainly, may be shared globally, in a more effective manner "(Andrade, 2013: 187).

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Religion In The Workplace: The Legal Framework In Portugal

Susana Sousa Machado
MA, PhD candidate
ESTGF:IPP/CIICESI , Portugal

Abstract

This paper deals with a reflection around religion in the workplace, especially in the Portuguese context, from a legal perspective. Thus, the goal here is to identify the main focal points of the legal framework in Portugal. We intend to demonstrate the most significant aspects of protection but also the weaknesses of the system. This reflection goes about perfecting opportunities to the level of articulation between employers' organization rights and religious freedom of the employees.

Keywords: Freedom of religion, workplace, discrimination

Introduction

There is a growing number of disputes related to religious freedom at the various stages of the employment relationship (Fahlbeck, 2004) that can go from the struggle against discriminatory behaviors for religious reasons to real duties confrontations; i.e. duties that appear in the religious context and duties regarding the execution of the employment contract (García-Pardo, 2004).

Even in Portugal, with a predominantly Catholic population, recently appeared the first cases brought to the Constitutional Court. For that reason, and in the current socio-political context, is essential to reflect on the effectiveness of fundamental rights in the field of labour relationships.

The present text seeks to carry out along the lines of interpretation of the Portuguese law and present some case law on the possibility of express religious beliefs. In this approach to the problem, considerations on the field of the relationship between religious freedom and labour relations will inevitably arise. We intend to draw perspectives of reflection from the Portuguese framework on the matter of freedom of religion.

It is important to begin by observing, as a starting point, that the Portuguese law does not provide any definition of religion. Notwithstanding, some authors consider that a belief in a supernatural entity is inherent to the

concept of religion (Machado, J., 1996). Therefore, a legal definition of religion could constitute a State interference, prohibited by the constitution, in the religious freedom of individuals. J. Machado points out that the notion of "religion is a matter of personal conviction, and not of coercion" (Machado, J., 2005).

The employees' protection from discrimination on grounds of religion
Constitutional background

In the Portuguese legal system, the freedom of consciousness, religion and cult is recognized on the Article 41 of the Constitution, consecrating three distinct but related rights: "The freedom of conscience, of religion and of form of worship is inviolable" (Article 41 no. 1). In that sense "No one may be persecuted, deprived of rights or exempted from civic obligations or duties because of his convictions or religious observance" (Article 41 no. 2). The principle is repeated in regard of religion, with enormous practical consequences, in no. 3: "No authority may question anyone in relation to his convictions or religious observance, save in order to gather statistical data that cannot be individually identified, nor may anyone be prejudiced in any way for refusing to answer".

Associated to this freedom is also the principle of equality and prohibition of discrimination, based on religion, political ideologically beliefs (Article 13): "No one may be privileged, favoured, prejudiced, deprived of any right or exempted from any duty for reasons of ancestry, sex, race, language, territory of origin, religion, political or ideological beliefs, education, economic situation, social circumstances or sexual orientation". Regarding that, the Portuguese Constitution establishes a general principle of non-discrimination on several grounds, including religion, and considers the active promotion of equality as a fundamental task of the State (Brito, 2012).

These dispositions should be interpreted in accordance with Article 16: "1. The fundamental rights contained in this Constitution shall not exclude any other fundamental rights provided for in the laws or resulting from applicable rules of international law. 2. The provisions of this Constitution and of laws relating to fundamental rights shall be construed and interpreted in harmony with the Universal Declaration of Human Rights." Among the applicable rules of international law are those of the European Convention of Human Rights.

Labour code

The Portuguese Labour Code (Articles 22 and 23) prohibit employers from discriminating against an employee or job applicant on the basis of religion among other grounds. Therefore, the labour law prohibits employers from treating persons differently because of their religion; it establishes a

non-discrimination principle, on the grounds of religion, in the field of employment and working relations.

The meaning of some notions in this field, such as direct (Article 23 no. 1a) and indirect discrimination (Article 23 no. 1b), have been transposed into the Portuguese Labour Code and are consistent with European law.

The definition on direct and indirect discrimination is almost duplicated with that of Directive 2000/43/EC, but a greater scope of discrimination can be found in the Labour Code. Its Article 23 considers in no. 1 that: "a) direct discrimination shall be taken to occur where one person is treated less favorably than another is, has been or would be treated in a comparable situation, on the basis of a ground of discrimination; b) indirect discrimination shall be taken to occur where an apparently neutral provision, criterion or practice would put a person on the basis of a ground of discrimination at a particular disadvantage compared with other persons, unless that provision, criterion or practice is objectively justified by a legitimate aim and the means of achieving that aim are appropriate and necessary". And specifies in no. 2 that "the simple order or instruction that purports to damage someone on the basis of a ground of discrimination constitutes a discrimination".

The Labour Code implemented the Directive 2000/43/EC and the Directive 2000/78/EC (Machado, S. S., 2010). And in that sense, Article 24 forbids the practice of discrimination on certain grounds such as "ancestry, age, sex, sexual orientation, civil status, family situation, economic situation, education, origin or social condition, genetic patrimony, impaired work capacity, disability, chronic disease, nationality, ethnic origin, language, religion, political or ideological belief and membership of a trade union".

Law on Religious Freedom

The Law no.16/2001 (Law on Religious Freedom - LRF) recognizes a principle of equality regarding religion in its Article 2: "1. No one can be privileged, beneficed, aggrieved, persecuted, deprived of any right or exempt from any duty on account of his or her convictions or religious practice. 2. The State shall not discriminate any church or religious community in relation to others."

In addition, Article 14 of the LRF provides that employees are authorized to suspend their work on the days of rest, festivities and during the periods determined by the religion to which they adhere, subject to certain conditions. But it is important to underline that the employee must make a request to his employer in order to exercise this right to suspend his work.

Enforcement to accommodate an employee's religious beliefs: religious holidays and worship days

There are no legal provisions in Portuguese law which requires the employer to provide an employee with a concrete reasonable accommodation for his religious beliefs. As noted, the Labour Code only contains provisions regarding non-discrimination on the basis of religion but does not include positive actions of practical application.

Overall the solution should involve the application of the freedom of religion as a fundamental right with all the principles which lie behind it. In a more concrete perspective, the LRF could be seen as creating a form of burden on the employer, namely to permit employees to take time off during working hours in accordance with their religious beliefs.

As stated above, the Law no. 16/2001 allows the employees to suspend work on the day of the weekly rest, on the days of festivals and during hourly periods that are prescribed for them by the religion that they profess. Such request is subjected to three conditions:

a) They shall work according to a flexible schedule ;

b) They shall be members of a church or a registered religious community, that has sent a list of the aforementioned days and hourly periods for the current year, to the Minister of Justice during the previous year ;

c) There shall be full compensation for the respective work period.

This normative provision has high practical significance because the majority of public holidays in Portugal, aside from the civil holidays, are related to Catholic festivities. Regarding other minor religions, the prerogative to take absence from work is similarly provided under Law no. 16/2001.

Until recently, there have been no known disputes of employers failing to comply with these legal provisions when properly requested by their employees. This is certainly a mechanism to promote equality.

Case law: a conclusion of practical application of the main principles

In the Portuguese case law the disputes related to freedom of religion are very recent but, because of that fewness, they are emblematic cases. The existing case law is concerning to the compliance of a weekly rest day and consequent leave from work due to religious reasons.

The lack of cases to point out regarding the individual aspects of exercise of freedom of religion, notably from a labour law perspective could be explained by the fact that the Roman Catholic religion is dominant in Portugal and other religions have smaller numbers of believers.

According a chronological order, we can begin to present a case that although not related to the employment relationship served as a booster

mechanism for the following decisions. Thereafter, we present two cases decided in 2014 by the Constitutional Court.

a) The applicant was on probation to be admitted to the Barristers Association and the final examination was fixed for a Saturday and this day is a religious holiday for Adventists of the Seventh Day Church believers. The Association refused the candidate request to take the examination in a day other than Saturday. The Appeal Court considered that the Barristers Association had violated the right to religious freedom on the grounds of Articles 13 and 41 of the Portuguese Constitution. And, because of that, the Association was forced to schedule a new date for a new examination.

b) The Constitutional Court, addresses the appreciation of the regularity and legality of the dismissal of an employee by the employer due to the behaviour of the employee who, being a believer of the Adventists of the Seventh Day Church, repeatedly refused to work after the sunset on Friday, when her working period ended after that time and thus to work overtime on Saturday. The Constitutional Court decided that the right for work leave due to religious reasons should apply to all cases where it is possible to match the duration of work with that of the leave, namely in shift work.

It can be understood from the judgment that a literal reading of the paragraph 1 of Article 14 of the LRF, which establishes the requirement of flexible schedules and compensation of the suspension period, would lead to an excessive and not to reasonable understanding of religious freedom, in terms not allowed by the proportionality principle. Indeed, the principle of flexible schedules cannot fail to accommodate all situations where it is possible to match the duration of the work with that the work leave of the employee for religious reasons, thus being verified the accommodation of the employee's fundamental rights (Machado, S. S., 2015).

A rigid and closed interpretation of the concept of flexible schedules was thus removed, in the light of the fundamental right to religious freedom (Machado, S. S., 2015). The Constitutional Court's argumentation is structured so as to oblige employers to seek solutions for managing labour organization which seek to protect and to take into account the exercise of the employees' fundamental rights.

c) A member of the Public Prosecutor's office who adhered the Seventh Day Adventists Church claimed before the Constitutional Court that the provision of Article 14 no. 1a of the Law on Religious Freedom, when interpreted as meaning that the suspension of work on a weekly rest day, as prescribed by the religion that she believes, is only applicable to workers in a flexible schedule is unconstitutional. The Constitutional Court argued that according to the Portuguese Constitution religious freedom is not restricted to the principles of freedom and non-discrimination but also involves reasonable accommodation in order to guarantee real equality. The Court

decided that the flexibility of working hours demanded by the law, in order to settle compliance with the exemption from working on Saturdays for religion reasons, covers the work done by a public prosecutor which is subjected to shifts (Machado, S. S., 2015).

Given the fact that Article 14 no. 1) of the LRF, in establishing - both for employees of the public and private sectors - the possibility of suspension of work under certain conditions, in the weekly rest day which is prescribed to them by the religion they profess, is no more than the enforcement of the right to religious freedom. And, particularly, the regime of working hours applicable allows for compensation of the periods of time when work leave took place. The Constitutional Court denied a restrictive understanding of the concept of flexible schedule regime, and ignored the perspective that the employee should choose between her profession and the religious beliefs she professed (Machado, S. S., 2015).

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Natural Disaster Governance: Barriers For Turkey[1]

Res. Assist. Tolgahan Aydıner
Prof. Dr. Hüseyin Özgür
Pamukkale University, Faculty of Economics and Administrative Sciences,
Department of Political Science and Public Administration, Turkey

Abstract

The aim of this study is to analyze the barriers of natural disaster governance for Turkey. First part of the study consists of definitions of disasters and disaster management cycle, theoretical discussions of natural disaster and local governance. The continuing and challenging part gives attention why Turkey has not adopted the natural disaster governance. This part consists of discussions of transcendental state, weak civil society and immaturity of local governance of Turkey. The mentioned discussions aim to correlate those barriers with immaturity of natural disaster governance. The study ends up with general evaluations and conclusions.

Keywords: Natural Disaster Governance, Governance, Local Governance, Turkey, Earthquakes, Disaster Management Cycle

Introduction

Disasters are important phenomena for people and governments. Especially the developing and under-developed countries with centralist public administration perspective realize more problems related with disaster when compared the other developed states. The biggest reason for this problem is highly the absence of participatory management for disasters. In other words, the classical Weberyan disaster management could be thought like a classical public administration perspective and nation states position themselves like *the steers of the public services* but the damages of disasters are not obstructed with centralist perspective. In particular, if natural disaster management is perceived as a social phenomenon, then it is needed more

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participatory and multi-stakeholder governance practices. However, Turkey has substantial barriers for the natural disaster governance perspective. The literature that interests natural disasters does not also give enough attention to the governance and the concept has just started to be discussed.

There are many definitions of disasters and natural disasters. Definitions and statements such as calamity, catastrophe (Yılmaz, 2003: 1), the corruption of the fabric of society and the inversion of current course of events to the worse after this corruption (Alexander, 2005: 27), vulnerability and uncertainty as a catastrophic event (Jigyasu, 2005: 49) are helpful definitions to understand the nature of disasters. However, it is needed to move away from the 'technical' definitions of disaster in order to find out what method should be followed for the management of disasters and natural disasters, which is the subject of this study. The matter which has importance in the conceptualization of natural disaster management is the truth that disaster is not only a technical issue but also a social reality. Such kind of a conceptualization sees disaster as a social reality essentially, assumes that it results from lack of defense, describes the concept of vulnerability as one of the basic components of social catastrophe (Perry, 2006: 13).

Another important issue and concept of disaster management discussions is the disaster management cycle. Although they have small differences in their expressions, the disaster management cycle and phases consist of four (McLoughlin, 1985: 166; Petak, 1985: 3) as;

• Mitigation • Preparedness • Response • Recovery.

The phases aforementioned involve the whole process starting from the happening of a catastrophic event until the sequence of measures to be taken before. However, it could be said that the most necessary phase for the natural disaster governance is mitigation phase with the presupposition of disaster is a social reality. Mitigation phase involves all planning and risk management phases which try to minimize the potential risks before disasters happen. This situation, which can be described as the harmony of the concepts of danger and awareness (Henstra and McBean, 2005: 304) and it reveals why mitigation phase is so important in that cycle.

The abovementioned arguments make the discussions of classical disaster management more meaningful, which will be criticized more comprehensively in the next part of the study. The main reason of this is that classical disaster management accepts the phases of disaster management cycle, which is an important step for disaster management, in a linear way. That is to say, classical disaster management describes disaster as a cycle and may rejects the existence of the science of management, puts emphasis on the claim/idea that the principal component of disaster management is the disaster itself rather than the management (Balamir, 2007: 27). Thus, in the aforementioned cycle lies the mistake of conducting all the phases in equal

importance and disaster management is perceived as a technical issue. This situation, which Balamir (2000: 44) described as classical earthquake engineering approach, isolates different actors and institutions from disaster management cycle in one sense and puts the state in a powerful place.

Theoretical Background: Governance, Local Governance and Possible Components of Natural Disaster Governance

Some new concepts started to be discussed in the perception of government with the economic and social transformation during the transition from Keynesian period to Post Fordist-Keynesian period and also as a result of the needs and necessities concerning the delivery of the state's own services in the context of government. Behind these discussions lies the claim that administrative modernization in the practices of delivery of service of modern nation-state, interdisciplinary equality and effective delivery of public services (Brenner, 2006: 114) have started to transform because of the factors of globalization and competitive market. On the other hand, flexible production standards –instead of Fordist production- have started to be demanded when the transition from industrial society to information has started. The period when the mentioned transition has occurred can be summarized as (Tekeli, 1999: 244): *a) the transition from industrial society to information society, b) the transition from Fordist production to flexible production c) the flow from nation-state structure to globalization d) the transition from modernism to post-modernism.*

The areas mentioned above have organic links among each other. The break from Fordist period in the production of goods and services has lessened the dependence on space while it has damaged the existence of the market which is easy to predict as in industrial society. The dimensions of competition and market have also started to transform with the appearance of less expensive and more profitable areas for meta production. There has been criticism about instrumental modernism and mind when some differences have occurred in terms of common good and right after the transition to information society (Tekeli, 1999: 245). The principles of classical administration have started to wear off with the period when network relations have gained importance and limits and the concrete have started to lose their importance (Tekeli, 1999: 246).

The concept of governance, which means the cooperation of the state, private sector and civil society and the ways of common service production (Şengül, 2001: 53), has started to be discussed and take place in both literature and practices of service execution especially after 2000s; but the term was first used in the World Bank's report called 'Sub Saharan Africa: From Crisis to Sustainable Growth' (Bayramoğlu, 2002: 86; Güler, 2002: 102). The governance definitions in this Report focus on to the new world

order, pluralist capitalist structure, and democratic process; the political system that has power to affect the executive process, accountable public administration and so on (Güler, 2002: 102). Although the concepts have different focuses, their intersection area meets in the terms of participation and plurality. In that regard, citizens/individuals becomes an important part of the new world order. The new actors, called local citizens, with the help of globalization, have to locate in a relational situations to solve their problems, because the citizens/individuals are the right actors who need to solve their own troubles in the best way (Andrew and Goldsmith, 1998: 111).

The other important term or concept that will make easier to understand the possibility of natural disaster governance is the term of local governance. Similar to governance, this term specifies the formulating and conducting the collective action in the local level (Shah, 2006: 1). The reason of this situation is related with the fact that the new world order demands to reduce of the dominant position of the central state in public service provision, political decision making and policymaking; and this reality could only be actualized by the *subsidiarity* which means public service should be produced in a lower unit that nearest position to the individuals (Göymen, 2000: 9).

The administration or organization models desired for disaster natural disaster management are generally consistent with mitigation and preparation phases before a disaster happens. The reason for this is that a command and control based, quick decision maker and hierarchical administration model is need after a disaster rather than a problem solving process which is really flexible and with many actors (Meuleman, 2008). Thus, although disaster management cycle points out to a whole and directly interrelated process, the process meant by disaster governance in terms of running involves the mitigation phase. As to be mentioned in the next parts of the study, when the problems experienced in disaster management in Turkey are taken into consideration, it is more consistent to place the state in a more superior and in organizer position in the cooperation of state, market and civil society as anticipated in natural disaster governance. The reason behind this is the truth that there is a lack of financially powerful actors who can affect the disaster management and that weak civil societies, with their socio-spatial and socio-economic situations, will create a security flaw against disasters (Wisner and Walker, 2005: 92).

On the other hand, the anticipated governance model for the natural disaster governance differs from the anticipated governance models of other policy areas such as education, health and tourism. The difference comes from the fact that in natural disaster governance, various actors are asked to gather and run the process during the mitigation phase yet before facing any kind of disaster. In other words, in the process of making a policy, while you

come up with solutions after facing a problem in other policy areas, you need to take holistic measures before facing a catastrophic even in natural disaster governance. In this context, the governance models of Duit and Galaz (2008) which are adaptable to complex systems can be made use of. What is problematic with the complex adaptive system is that reality doesn't occur in a linear fashion and that the change at one point will affect other points and processes in very different and great ways (Duit and Galaz, 2008: 312). The reason behind this is the existence of policy networks which are fragile and closed to feedback especially concerning natural disaster governance. Although it is really difficult to manage and organize the phases after a disaster has occurred, it is also difficult to guess in what levels and circumstances the policy networks will be made, networks which are predicted to be necessary for the mitigation phase. Four governance types can be mentioned for the analysis of these systems/networks which are fragile and difficult to predict. First of them is rigid governance where exploitation through institutions, norms and hierarchies is high while exploration is low (Duit and Galaz, 2008: 321).

It is claimed that coordination among institutions is high while feedback and information flow is weak in rigid governance model of Duiz and Galaz (2008). The second model is robust governance where both institutional level of exploitation and high level of exploration can happen (Duit and Galaz, 2008: 321). This model is also defined as the ideal governance. In fragile governance, which is the third type, it is mentioned that there are not enough numbers of institutions and there is a lack of information flow (Duit and Galaz, 2008: 322). The last model is flexible governance in which state does not have the capacity of high institutions for exploitation while exploration activities are a lot (Duit and Galaz, 2008: 322). These four types are important to make the analysis easier. However, the ideal governance model needs a policy network where there are institutional systems, information flow among many actors.

Barriers of Natural Disaster Governance for Turkey: An Exploratory Systematization

Certain and inclusive statements for natural disaster governance should be stayed away from as it hasn't been started to be discussed seriously in the literature and there are not enough academic studies on it. However, building the starting point on mitigation in a holistic disaster management system means the preservation of some presuppositions for natural disaster governance. At this point, deciding on the components of natural disaster governance will make the analysis of the research subject easier. Primarily, disaster management policy puts many great responsibilities on the state in terms of creating public opinion before a

disaster happens and of meeting the demands of people during intervention in a crisis. With the truth that the state is the most powerful actor in the discussions of natural disaster governance, the approach of the state to disaster management will be the first step for the discussions of the possibility of natural disaster governance. Legal and institutional regulations are needed assessing in these discussions. However, the analyses in question are not enough to assess the components of natural disaster governance, and it is useful to study the state-civil society relationship to make the discussions more quality. In this context, it has gained importance to discuss which economical processes the state has been with historical presuppositions, its relationship with civil initiatives and how willing it is or is not to create areas of civil society. Thus, civil society discussions are also an important step for the components of natural disaster governance. Local administrations are among the most important components of natural disaster governance because of the fact that they are the implementer of disaster policies and that they have to work with the central government for the coherence of the administration. When compared central government, local administrations can manage mitigation and risk management, city plans, town planning implementations, the communication with civil society institutions and households better.

It has been written in the literature of natural disaster management that the authority in the organization of disaster management in Turkey is the government or the state, and the coordination and lack of harmony between a centralist disaster management and other institutions have been criticized (Çorbacıoğlu, 2005; Ganapati, 2005; Öztürk, 2005; Yavaş, 2005; Yılmaz, 2005; Özerdem and Jacoby, 2006; Balamir, 2007; Keleş, 2007). The reasons behind the criticisms are that it has always been put emphasis on the processes after a disaster for years in Turkey, that post-disaster legal and institutional regulations have gained speed and that town planning implementations have not been done according to mitigation and risk management plans. On the other hand, it has been commented that 1999 İzmit/Marmara earthquake was a turning point for Turkish disaster management system and approach (Balamir, 2001; Ganapati, 2005).

The starting point for such kind of a discussion is evaluation of the legal and institutional regulations in terms of their periods. However, the analysis or discussion of centralist disaster management only with this data is not enough to find out why natural disaster governance has not developed in Turkey. At this point, it is also critical to study the state-civil society relationship because the citizens' and civil societies' perception of disaster, the state's attitude of approaching disaster; property, fundamental rights and freedoms and legal regulations reposition the relationship between individuals and state in many areas as civil society. It is needed that civil

society could be powerful and well equipped against the state and that civil society keeps the state alive in disaster management because the relationship between civil society and state is an important part of governance discussions[3]. Thus, it will be helpful to understand the hidden side of centralist disaster governance when it is analyzed in what extent powerful or transcendental state tradition will allow civil initiatives to occur.

The discussions of transcendental state tradition in Turkey (Mardin, 1973; İnalcık, 2005; Heper, 2010) are an important step to explain the relationship between the state and civil society. What Heper (2010: 30-31) conceptualized as transcendentalist state is a type of government where the state is institutionalized around certain norms, where these norms direct the political life, where bureaucrats are in the position of decision makers, and where political parties can work as state apparatus. Mardin has also made a serious contribution to this topic and stated that modernization actions in Europe are shaped by contractarian dynamics. In this context, the contract tradition in Eastern Europe, which was based on agreements and privileges between the state and bourgeoisie, was adapted in Ottoman State with the processes based on the autocracy of the center on the periphery (Mardin, 1973: 33). Mardin has expanded this argument of his and claimed that the economic and cultural disconnection between the center and periphery has been passed down to now in Turkey and that the official ideology exposed the villagers to many impositions in terms of both cultural and economic way (Mardin, 1973: 52). Thus, state - civil society relationship of European states, which was shaped by the peculiar economic and social dynamics and capitalism processes, was passed down to Turkey from Ottoman Empire as a heritage, in one direction and with the state holding the economic dynamics in its hand. The monolithic construction of the individual - state relationship in historical context has also hindered the organization of artisan associations, trade associations, and sectorial associations or in general meaning civil societies which could create benefits against the state, negotiate with it or could impose sanctions to it.

The tension with state – civil society relations is so similar to central – local government relations discussions of Turkey. Since the time of modernization of Ottoman Empire, the ontological situation of local units have always been problematic through the discussion whether they are the autonomous democratic places or not. However, counter arguments also defend the fact that local units are the sub-units of the central government. In that regard, the distinction between the local administration and local government gets important (Kösecik and Özgür, 2009). If the discussion offers the fact that local agent could only be an administrative unit that

[3] A similar approach could be seen in Ganapati's (2005) study.

represents the central state, then we refer to the term 'local administration' (Keleş, 2009). This perspective perceives the state's administrative system as an entire entity; local and central agents work for the same aim. On the other hand, if the argument implies that local agents are independent and autonomous units, then it is referred to the term local government in a liberal way. Those distinctions have occurred in the separation of state tradition of France and America. Turkey is so closer to the Napoleonic French system. In that regard, especially after the 1961 Constitution, centralization and decentralization debate, which was one of the most important discussions for Turkish modernization, was ended. By this way, administration system was transformed in a new position that central and local agents should work through the aims of integrity of administration (*idarenin bütünlüğü*). The new term, similar to the transcendental state perspective, comprehends the localities or decentralization movements only the sub-units of the central state. In other words, the mentioned perspective sees the existence of localities in possible only with the existence of central agent (Güler, 2000). For that reason, a constitutional or legal amendment that relates with local administration affects all the local levels in the whole country. By this way, local administrations are not independent actors from the central government and it blocks the maturation of the local governance implementations.

Under the light of the above discussions, not surprisingly, local administrations have failed to be active actors in natural disaster management because of the effect of centralist disaster management and classical earthquake engineering in Turkey. Although there are many reasons for that, the foremost reason is that disaster management is not focused on explicitly and strongly in the laws of establishment of local administrations. Even though municipalities have responsibilities like preparing disaster and emergency plans, the content, effectiveness, importance and practicality of these plans are highly questionable. Moreover, degradation of disasters as "crisis" in emergency plans is also another important problem. Even if the matter is analyzed from the perspective of emergency management, it is an important problem of municipalities not to take the opinions of ministries, public institutions, trade associations, universities and other local administrations in the preparation of these plans (Özgür et.al, 2014: 77). On the other hand, the lack of officials and competent staff about disasters in local administration is at maximum. There are not any disaster experts, except civil defense experts, in local administrations in staffing norms (Özgür et.al, 2014: 77). Moreover, as it was mentioned in the previous parts of this study, Construction Law with no. 3194 and Disaster Law with no. 7269 hold civilian administration liable for disaster issues but unauthorized for construction work, and hold municipalities authorized but independent from responsibility (Balamir, 2000: 109). Moreover, the role and authority of

Housing Development Administration of Turkey about urban transformation may put municipalities in a difficult position in construction and disaster issues. In addition, the Law # 6360 came into force in 2012 that constitute 30 metropolitan municipalities made a great transformation about the scales of municipalities in local level. Because of the expansion of local public provision of municipalities, the participatory disaster management process gets difficult. The reason of the situation is that with grew up of spatial width of the metropolitan municipalities; capacity of the municipalities gets also extended. By this way, metropolitan municipalities have to face various disaster troubles of sub-level units.

The aforementioned discussions have an organic link with the practices of central and unsuccessful disaster management. The reason of this organic link is the powerful, transcendental state tradition, and the weak civil society. Security flaws against disasters in weak civil societies strengthen this claimed organic link. The term "vulnerability" by Wisner and Walker also supports this theory. Vulnerability focuses on the reality that socio-spatial and socio-economic circumstances shape disasters (Wisner and Walker, 2005: 92). Wisner's definition of vulnerability will help the theoretical discussion of transcendentalist state tradition be evaluated in the context of disaster awareness and vulnerability (Wisner, 2005: 11 from Bolin, 2005: 116):

> *"The characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recovery from the impact of a natural hazard."*

It is not possible to say that civil societies and people were not active participants when looked at the experiences of Turkey in natural disaster governance in the past. As can be seen, especially in the parts where legal and institutional regulations were discussed, it is clear that the state is the dominant actor of disaster management, and that necessary circumstances have not been provided for any disaster management system where civil society organizations can take part in. In this context, as can be seen from the studies which explain the relationship between civil society and disaster management in Turkey (Özerdem and Jacoby, 2006; Ganapati, 2005; Kubicek, 2002; Tarih Vakfı, 2000), civil societies have started to take part in disaster management of Turkey after the 1999 İzmit earthquake. However, the role of civil society, which was claimed to have a turning point after the 1999 İzmit earthquake, does not really mean a civil society structure which can have powerful role in a holistic disaster governance. In this context, although civil society organizations have put some initiatives into work after the earthquake, the real agent of the process has been the households and individuals (Tarih Vakfı, 2000: 289). Thus, individuals, who are independent from the practices of hierarchical and traditional administration, who can

decide on their own, and who can communicate quickly, took active roles in first aid and dressing for wounds. However, it is not possible to talk about a holistic and planned initiative of civil society here. It is not possible to say that this civil movement where, institutionalism, planning and programming are not felt enough (Tarih Vakfı, 2000: 290) has established the ground to contribute for cooperation and long-term disaster governance.

Conclusion

The main purpose of this study was to present the barriers of natural disaster governance of Turkey. Thus, it is hard to develop natural disaster governance components in Turkey because of the above explained/illustrated reasons. The existence of weak civil society in a powerful and transcendentalist state tradition in Turkey, the lack of civil initiatives in disaster management policies which can inspect/trigger/impose sanctions on the state, the evaluation of natural disaster only in terms of earthquake engineering, the existence of civil society initiatives after the 1999 İzmit earthquake and only after a disaster happens, lack of market actors in mitigation phase of disaster management cycle (Aydıner, 2014). When examined in terms of the actors, disaster management profile of Turkey looks problematic because of the powerful status of the state, the pressure of central administration on local administrations in terms of management coherence, local administrations' lack of capacity in disaster management, the inactivity of private sector in mitigation policies, non-participation of civil societies in a sustainable disaster management system which covers mitigation phase. Thus, there is a need to talk about the existence of *a weak and fragile administration network* in Turkey when the opinions of Duit and Golaz (2008: 312) are taken into consideration. The reason behind this is that the state is weakly connected in terms of institutional construction and that civil societies and private sector actors are not powerful enough to guide and direct the state, force it to be transparent and participant, and negotiate with it in reasonable ways and for the sake of society (Aydıner, 2014).

Another important topic is that natural disaster governance is a newly used term in the academic literature. For that reason, it is impossible to define the whole components of natural disaster governance; rather the first step could prove the barriers on it. However, if the future studies begin to use the sub-topics of governance in the disaster literature, like *accountability, check and balance, transparency,* and may be the most important one could *participation*; then in a few years rather than demonstrating barriers, it could be written the structural components of disasters governance.

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Romania And The British Model Of Government (1866-1914) : A New Approach To The Study Of The Romanian Politics

Dogaru Cosmin-Stefan
Assistant professor, PhD
Faculty of Political Science, University of Bucharest, Romania

Abstract

In 1866, following the accession of a foreign prince to the Romanian throne and the sanctioning of the new Constitution, the Romanian political elite managed to strengthen the political regime of the age. Both conservative and liberal leaders became conscious of the necessity of structuring a political regime based on the constitutional monarchy, which could generate political, cultural and social-economic changes.

The liberal and conservative politicians, many of which were educated abroad, imposed a series of new principles, ideas and values in the Romanian realm in the second half of the 19th century. These invariably lead to a gradual change of the political regime, the political elite wanting and managing to diminish the gap between Romania and the other European states to a great extent. The present article proposes a new perspective, based on historical facts studied with the instruments of political science and addressing a topic that belongs to the political history and that calls the attention of numerous scholars nowadays.

I also intend to discuss a new approach regarding the analysis of an important aspect of the Romanian political regime. My research concentrates on the following research challenge: How was the British classical model adjusted to the Romanian realm and how did it generate a two-party system with specific features for the Romanian political life?

Keywords: Liberals, conservatives, government alternation, political regime, Romania

Introduction

Attaining and adjusting the European model at all levels: political, social, economic and cultural was a milestone for the political class and for Charles I in their attempt to bring about the modernisation of Romania. The present article intends to illustrate the vision of some of the important

political leaders of the age, both liberals and conservatives, who worked together with Charles I towards the strengthening of the Romanian political regime. The ideas, values and principles of these political leaders where useful in the act of governing and their theoretic basis was related to their own activity within the wider state activities. In time, they accumulated political experience, both at a parliamentary level and at a governmental level.

My research question is thus related to the mode in which the British model of government was adjusted to the Romanain realities and generated a two-party system that managed to gain its own specific features with time.

This article's major objective is to present the vision of a few important politicians regarding the construction of the Romanian political regime. The sources for this are political discourses and memories analysed with the instruments of the critical text analysis and the comparison of the various texts.

I.
The young Romanian state and the liberal political regime

After 1866, the political class and Charles I tried to strengthen the institutions of the state and, implicitly, to help the young Romanian state during a very difficult period from a political, diplomatic, economic and social point of view. Both the liberals and the conservatives had well established principles, which they have maintained in the political realm along time.

The political leader Vasile Boerescu was convinced of the fact that the 1866 Constitution was "*one of the most liberal constitutions in Europe*" (Boerescu, 1910, p. 245), which attracted the loyalty of the political leaders and of Charles I, its principles being attentively respected for a good operation of the Romanian state.

Regarding the nature of the political regime created in Romania after 1866, the politician Vintilă I. Brătianu highlighted the fact that: "*it is well known that the constitutional regime established in 1866, left by the generation that accomplished the political rebirth of Romania, modelled after the Belgian Constitution, itself inspired from the English system, places us in the category of the parliamentary countries, in which the government needs to win the support both of the Parliament and of the chief of state*" (Brătianu, 1906, p. 12).

The European model of state organisation represented a starting point from the creation of the 1866 political regime onwards and the application of some European models in the Romanian political regime turned out to be useful and necessary during that moment in order to diminish the gap that existed between Romania and other European states. In that period, Romania

experienced a liberal political regime. Nonetheless, the country "wasn't a democratic society. But, it was indeed a liberal one (Bulei, 2013, p. 34).

The operation of the Romanian political regime represented an important concern for the liberal Vintilă I. C. Brătianu, who appreciated the fact that, during its stay in the opposition, a political party had to be "*a control agent of the executive power*" who could "*check the solutions proposed by the adversaries, oppose them when they were not good and even propose different ones*" (Brătianu, 1937, p. 374).

The British model of government was preferred by the majority of the politicians because it ensured the government alternation between two great parties, something that was applied also in the Romanian case. Throughout that period, Charles I was the adept of the British model of government because it ensured the political stability and invariably lead to the modernisation of the country, a major objective he and the political elite had. Under these conditions, we can share the idea that: "Britain has traditionally enjoyed the benefits of a stable, consistent, two-part system" (Ingle, 1987, p. 17).

The existence of the liberal and the conservative groups favoured the formation of the Romanian two-party system, which successfully borrowed the British model of government. Along time, the evolution of the Romanian two-party system had a number of stages, with specific features regarding the political life in general, the relationship between the government and the opposition, the political strife etc.

At the same time, in 1866, the liberal politician Eugeniu Stătescu firmly asserted the government principles followed by the party he belonged to. He highlighted exactly the essential principles stipulated by the 1866 Constitution, which "*set the foundations of the Romanian state*": "*hereditary monarchy, embodied by Charles I and his dynasty, on the one hand, and liberty and democracy, on the other hand! These are our principles of government. These are the principles that inspired all our actions since the liberal party has acceded to power and in which we have always looked for our power and our line of conduct as a government!*" (Stătescu, 1886, p. 5). He also analysed a crucial aspect of the Romanian political regime - that is the government alternation, underlinig the fact that: "*the parties exercised their power in turn, as the context and the interests of the country asked for the leadership of either one group or of the other*" (Stătescu, 1886, p. 24).

Analysing the evolution of the two-party system, one can note several stages but, with the consolidation of the alternation of the two parties, the National Liberal Party (1875) and the Conservative Party (1880), the politicians became acquainted with this political practice, which gradually became a custom of the Romanian political regime.

Coming from the other part of the political spectrum, the Junimea leader P. P. Carp (the Junimea group was a part of the conservative group), expressed the following ideas regarding his vision of the legitimacy of the creation of a government within the Romanian political regime: "*a government is constitutional: first, when the king appoints it and second, when the Parliament maintains it in power*" (Carp, 2000, p. 359).

Nevertheless, the role of the constitutional monarchy was essential in the functioning of the political regime. Prince and then king Charles I (Romania become a kingdom in 1881) reinforced the government alternation of the liberals and the conservatives throughout that period (1866-1914). According to the Constitution, Charles I was an arbitrator of the political life (Damean, 2000, p. 99).

The political leader Alexandru Lahovari referred to the role of Charles I as a constitutional monarch during a meeting of the Senate, on 15 November 1888: "*if we have a constitutional king and a constitutional regime, that is supposed to help us out of such violent bloody solutions* [the riots created by the "United Opposition" against the Brătianu government] */.../ Then, the king stops just registering the ministerial decrees and becomes a high arbitrator between the fighting parties*" (Lahovari, 1915, p. 9).

During that time, the two important pillars of the Romanian state were indeed the chief of state and the Parliament - an ideea expressed also by the liberal Vintila I. Brătianu and by the Junimea member P. P. Carp. Both the Parliament and the constitutional monarchy lead to the strengthening of the liberal political regime, which was on its way towards democracy.

The development of the Romanian two-party system

From a general perspective, a two-party system can be outlined as follows: "a two-party system is duopolistic in that it is dominated by two 'major' parties that have a roughly equal prospect of winning government power" (Heywood, 2007, p. 284).

The construction process of the political regime during that age was based on the two-party system. The application of the British model referring to the government alternation represented a constructive aspect of the Romanian political regime. The British model of government was preferred by Charles I and the political elite, because it generated political stability (Jeffrey Kopstein, Marck Lichbach, 2009, p. 54). Under such conditions, over some time, the two-party system engendered stability in the Romanian political regime.

The Romanian two-party system went through several stages within the Romanian political realm; the formation and consolidation of the two government parties, the National Liberal Party and the Conservative Party, the relationship between Charles I and the political elite etc. These stages

were connected to the development of the reign of Charles I (1866-1914): the first stage, between 1866-1871, was characterised by political instability and it was followed by another stage, between 1871-1895, mainly characterised by the tendency of the two political forces to maintain the power for a long period of time.

Under these conditions, Charles I became conscious of the necessity of the structuring of an organised alternation of the National Liberal Party and the Conservative Party in order to ensure the political stability and consolidate the modernisation of the country - processes that had started in 1866.

Thus, the period 1895-1914 constituted the last stage of the reign of Charles I, a different type of alternation being noted then; during this type of alternation, the National Liberal Party and the Conservative Party succeeded each other to the government in an organised and efficient manner (each government lasting for an average of four years) that ensured the political stability and the stability of the Romanian two-party system (Dogaru, 2015, pp. 51-56).

The British model of government operated by Romania during the reign of Charles I

After the sanctioning of the 1866 Constitution, the Romanian political regime could be described as liberal, on its way towards democracy. Charles I and the majority of the political leaders considered that the structuring of a political regime on the basis of the two political forces - the liberals and the conservatives - would lead to the consolidation of the institutions of the young Romanian state.

Regarding the state organisation, the British model of government was well adjusted to the Romanian realm, initially imposing a government alternation of the two political groups and then of the two modern political parties, The National Liberal Party and the Conservative Party, which generated a two-party system (Hitchins, 2004, p. 104). Even under such conditions, the Romanian two-party system had its own specific features due to the particularities of the Romanian realm regarding the political life, the mentalities of the politicians etc.

For this political project, the liberal leader I. G. Duca discussed the British model that Romania borrowed and maintained during the reign of Charles I. He described this political model as follows: "*for many centuries, England has had two great political parties, the Tory party or conservative and the Whig party or liberal. Out of their strife, out of their ideas and aspirations, the power of Great Britain and its domination appeared /.../ It was rightly said that the secret of the English parliamentarism was the institution of the leader, of the chief of the party who represented and*

personified the tendencies of his group /.../ in Westminister, the opposition itself was organised as well as the cabinet. In the London Parliament, it is the custom that the leader should sit together with his party members at the left of the speaker and in front of the government bench. When the government steps down, the leader goes to sit on the government bench and the former government sits on the opposition bench" (Duca, 1994, p. 11).

The British model of government turned out to be a constructive aspect of the Romanian political regime; the country had a lot to win during that time. With the consolidation of the two-party system, the politicians started getting used with an organised alternation according to the British classical model.

The government alternation of the liberals and the conservatives

An adept of the government alternation of the two political forces, the conservative Take Ionescu considered that this political practice of government "*was not even a new one and would not end soon; one could not guess the moment when it would end because that end would also mean the end of the contemporary Romanian politics and the orientation of the society on a field that was different from the one it worked on until then*" (Ionescu, 1903, p. 103). Take Ionescu understood the utility of the operation and of the maintaining of the government alternation of the two parties with the end to ensure the good operation of the political regime created in 1866.

Moreover, his vision was oriented towards the fact that: "*the parliamentary life was life through the political parties and there was no life through the parties if one party was always in power*" and "*it is /.../ indispensable that the parties alternate in governing the country*" (Ionescu, 1903, p. 106).

Another important leader of the age, Titu Maiorescu, joined the vision of his colleagues and admitted that the government alternation supposed the existence of "*at least two parties that should alternate in power according to the necessities of the country*" (Maiorescu, Vol. IV (1888-1895), 2003, p. 410.) while respecting the well defined parametres of the Romanian political game. His vision was clear: "*a party and a government, through too much use and abuse of its power, reaches a moment when it is not anymore necessary for its country; another party should come and become more useful than the overthrown government*" (Maiorescu, Vol. II (1876-1881), 2003, p. 138.).

I. G. Duca mentioned the fact that, at the end of the year 1913, the liberals, according to the existing political custom, were ready to accede to power while the conservatives, divided as always due to their inner party strife, could not resist for long in power: "*while the conservative government was ready to step down, we were slowly preparing our coming to power. Oh,*

sweet times of party alternation, with so much art transformed by king Charles I in government dogma" (Duca, 1981, p. 13).

Indeed, the majority of the politicians supported the alternation mechanism and the structuring of the political platform in 1866 and, later, the consolidation of the two political forces, which changed from political groups into two great parties and favoured the construction process of the two-party system in Romania.

Conclusion

Although during that age there were also tensioned situations, the politicians, both liberals and conservatives, generally contributed to the normal evolution of the governmental and parliamentary activity. With time, their theoretical basis, obtained during the years they were educated abroad, was completed with a well defined political experience during the reign of Charles I.

With the aid of Charles I, the political class drafted a project that turned out to be feasible since they all understood the necessity to diminish the gap that existed between Romania and the other European states of the time. Their vision was clarified around the political consensus materialised in a well defined strategy on the government alternation of the liberals and the conservatives, according to the British classical model of government.

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Modeling and Managing of Random and Sudden Demand of Inventory

Afrah, M., Al-Tarawneh
Salloom, A., Al-Juboori
Industrial systems engineering, College of engineering, Mutah University

Abstract

Inventory management represents an important factor for any company or enterprise because it is the key of the market competition feature. Owning a high stocks or stock less than the limit required, represents a challenge for the companies and enterprises, especially in light of exigent circumstances may meet. It is increasingly important when the demand becomes sudden and outside the ordinary situations. The main objective of this study is to model and manage the inventory when the demand of product is sudden (unexpected) and how the company and enterprise can deal with it in case if there is a limit time for delivery which affects the company work and required additional cost for overtime work. So, a general visual basic computer program was designed and tested to control and manage the inventory in all conditions (i.e. normal and emergency). The program was verified on a case study which is the Jordan Chalk Manufacturing Company. The results of the program implementation on the case study have shown that the program can deal with all cases of inventory successfully and efficiently.

Keywords: Demand, Lead time, Safety Stock (SS), Reorder Point (R) and Order Quantity (Q).

Abbreviations:
SS: Safety Stock
R : Reorder Point
Q : Order Quantity
JD: Jordanian Dinar

Introduction:

One of the inventory purposes is to meet the variation in product demand [1]Inventory serves as: A cushion, as it absorbs fluctuation in supply and/or demand of goods, which could be a challenge for companies and potential in some situation and circumstance, especially when these demands sudden and unexpected or random [2]. Inventory is one of things that can not be

dispensed with in most institutions. The concept of inventory includes the following: the materials and components (raw materials, under processing and finished products) which are industrial enterprises retain and doesn't use it at the present time, but to help them in the implementation of the requests for their customer in the future [3]. Inventory modeling uncertainty may result either from demand or from supply processes within demand and supply sources, this uncertainty can divided into timing and quantity effects [4].

When customers request items, therefore the supplier must response for this demand from current inventory at appropriate time and quantity. This situation ″demand″ may represent a challenge for the supplier especially when it is sudden or random .This work will focus on this case and how the company can deal and manage this situation by another mean, also how the company employs its capabilities to meet these emergency situations? [5]

Components of Inventory Policy (Basic concepts):

Before building any model for controlling inventory there are some elements must be defined and well known, which represent the basic of the mathematical inventory model, which are:-

(1) Demand:-

The Inventory demand represents the number of units of any product which is requested during any specific period. It would be a random variable and a stochastic inventory model would be used [6].

(2) Lead Time:-

A component of inventory model represents the amount of time required by the supplier to meet a customer need. Also this is known as a cycle time [7]. It may be fixed or variable.

(3) Safety Stock (SS):-

Safety stock is an excessive amount of stock that the company keeps it to meet the unexpected demand during the period of supply [8].

It is added as a hedge against stock out when demand is uncertain [9]. Safety stock determines the chance of stock out during lead time and the complement of this chance is called the service level. The higher the probability inventory will be on hand, the more likely customer demand will be met. Service level of 90% means there is a 0.9 probability that demand will be met during lead time and 0.1 probability of a stock out [10].

(4) Reorder Point (R):-

It is the amount of the product that when the inventory level reaches to it. So, a new request of the product must be organized in order to ensure that can arrive before the stock reaches to the safety stock level [11]. In another words the number of items left in inventory when an order is placed [10]. So,

determining a reorder point can help in minimizing the chance of stock out, also reducing the amount of money tied up in inventory.

(5) Order Quantity (Q):-

It is the amount of product to be ordered. Also it represents the number of pieces ordered to replenish the inventory [12].

Inventory Management Program Design and Its Verification:-

A general Visual Basic computer program was built and verified to manage and control the inventory of the normal and emergency situations. This program was verified on Jordan Chalk Company as a study case.

Program Description:-

The program focuses on managing and dealing with inventory of the company during a specific time period and controlling the demand quantity and how these demands could be executed depending on mathematical model which was built for these situations. The collected data from different recourses were formulated in the program. The program was written by visual basic language to facilitate the explanation of every thing related to inventory in addition of processing the data the program will store all data entered to it to be used later on. Figure (1) shows the first step which is a shortcut of the program.

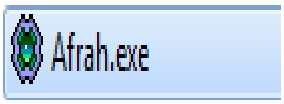

Figure (1): Store Inventory-System shortcut.

This icon represents the shortcut of the program was built which has the name store Inventory-System; to enter just double click on the shortcut icon, as in figure (2).

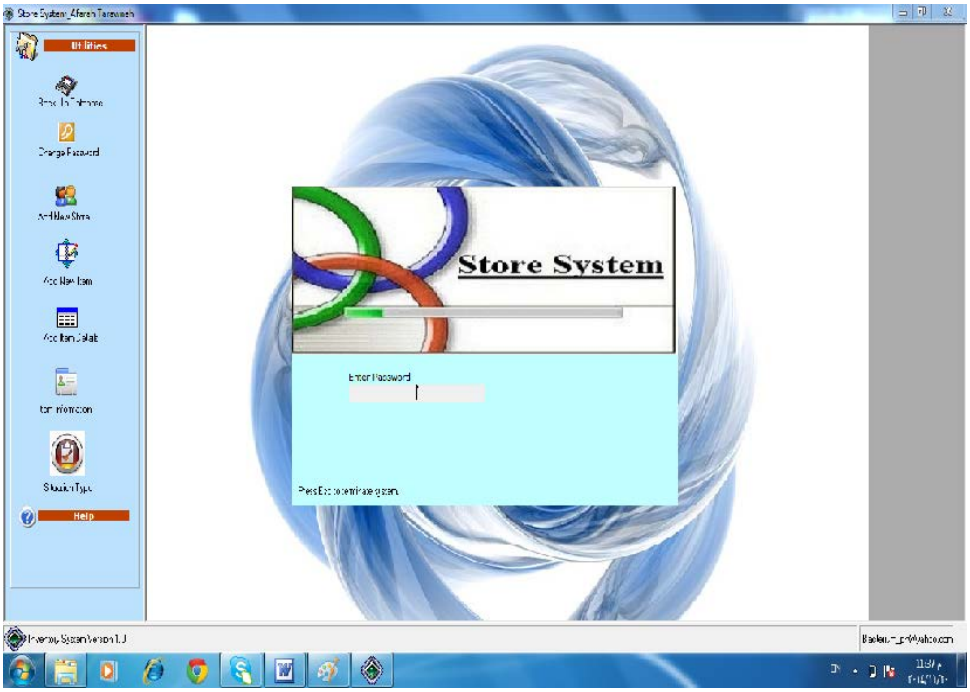

Figure (2): Store Inventory-System window.

After opening the program window user will see the "Enter password" message which requires to enter the password to allow the user to enter the pass- word which is "invent6" then by clicking on the enter key as in figure (3).

Figure (3):"Enter password" window.

Figure (4): Entire program window.

Figure (4) shows how to enter the program window. There are several utilities are required to deal with the company inventory, as following:

(1) Click on the back up database utility, a backup database utility window will open as this in figure (5):

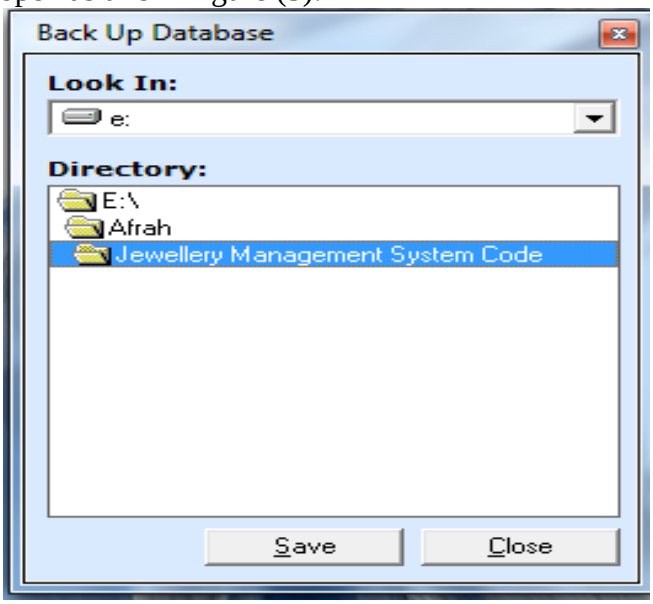

Figure (5): Back up Database utility window.

This utility is used to make a copy of all data, files, directory and information that entered to the program about the store and their products.

(2) Click on the (change password) utility, a change password utility will open as in Figure (6):

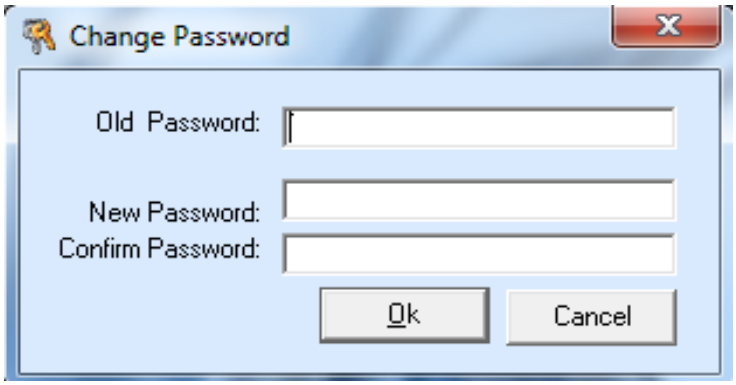

Figure (6): Change Password utility window.

This will be used to change the password in order to enter the program. Depending on this window the following procedure will be used to change the password:-

- Enter the old password of the program in the old password box.
-Then enter the new password in the new password box which can include characters and /or numbers.
- Then re-entered the new password in the confirm password box.
- Click on ok key to adopt the new one, the cancel key is used to avoid changing the password

(3) Click on the (add new store) utility, add new store utility window will open as in figure (7):

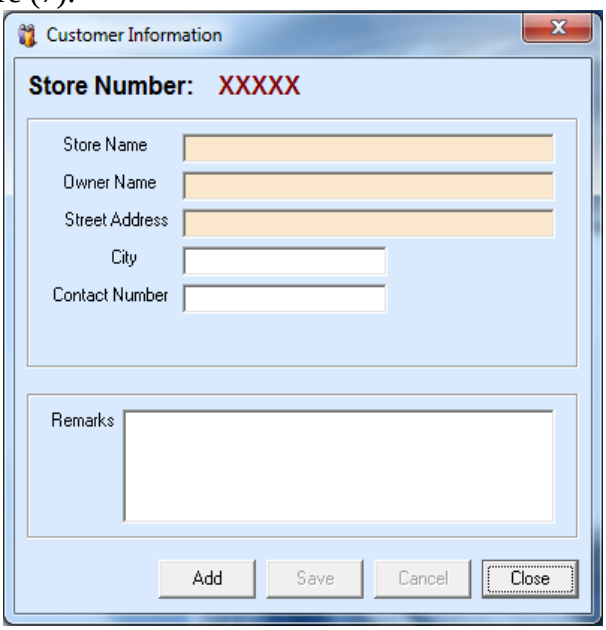

Figure (7): Add new store utility window.

This utility is used to add a new store to the company and to describe the general information about it. When clicking on this utility the store number has the form as (xxxxx) value at the first time. Boxes can't be filled unless the add key is pressed. When the add key is pressed the store number change form (xxxxx) value to specific value depends on what last store numbers were entered, and the pointer also will appears in first box (store name) when add key pressed.

- Store name box: It is used to enter the name of the company store.
- Owner name box: To insert supervisor name of the store.
- Street address: To insert the address of the company store.
- City: In which area/zone in which the store is located, if the company has many branches.
- Contact number: It is used to enter the phone number that used to communicate with the worker in this store
- Remarks: It is used to enter any additional important data and notes about the store that can't entered in the previous boxes but it must be known.
- Save key: Used to keep all information that entered in this window about the store "keep it in a specific database".
- Cancel key: To avoid all information entered in this window about the store and close key: To exit from this window.

(4) Click on the (Add New Item) title, and add new item utility window will open as in figure (8).

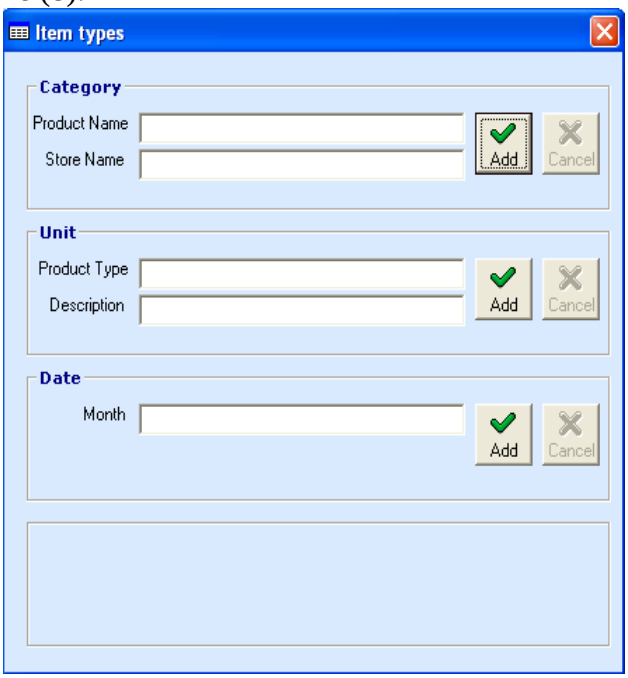

Figure (8): Add New Item utility window.

This utility is used to insert the product that was stored in a specific area. Also this window includes different boxes to describe this product. The required informations divided into three groups as the follows:-
Can't add any information in these boxes without clicking on the add key.

(a) Category group: This is including the followings:
- Product Name box: In this box will insert the type of the product which will be stored in the warehouse? (General name of it)
- Store Name box: Used to insert how this product is stored (some products may have a name as number or symbol)

(b) Unit group: This is including the followings:
- Product type box: It is used to insert the state of the product if it is under processing or final product.
- Description: To insert data that describes how product is store and used? As number, kilogram, etc.

(c) Data group: This is including the followings:
- Month box to insert in which month the product is entered to store as inventory. (Click on cancel to delete any data was entered in the boxes).

(5) Click on the (Add Item Details) utility, the window will open as in Figure (9)

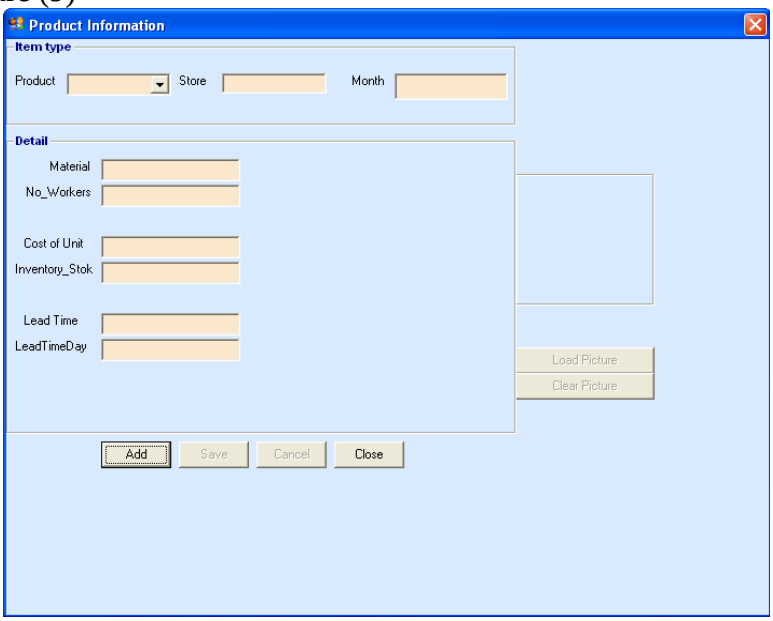

Figure (9): Add Item Details utility window.

This utility used to insert important information about the product that stored, so it is also called product information window. It includes two parts:-

(I) Item type part: It includes the following boxes: product box: Used to select a specific product has already been entered by clicking on the arrow to see all the products inserted using the previous window. Then the stored product will appear in the second box and in the third one the month in which the product is stored will appear automatically when user selects the required material.

(II) Detail part: It contains the followings:-

- Material box: It is used to insert how many or what are the materials used in the manufacturing of this product (can insert number or character).
- No of workers box: To insert the number of workers participants in producing this product through all production stages.
- Cost of unit box: How much does each unit of the product cost including direct and indirect cost.
- Inventory-stock box: How many units of this product exist in the store?
- Lead time box: The time from demanding the product until it delivers to the customer (in month).
- Lead time day box: The value in the previous box but in days (Lead time days = lead time *30).

(6) Click on the (Item Information) title, an item information utility window will open as in Figure (10):

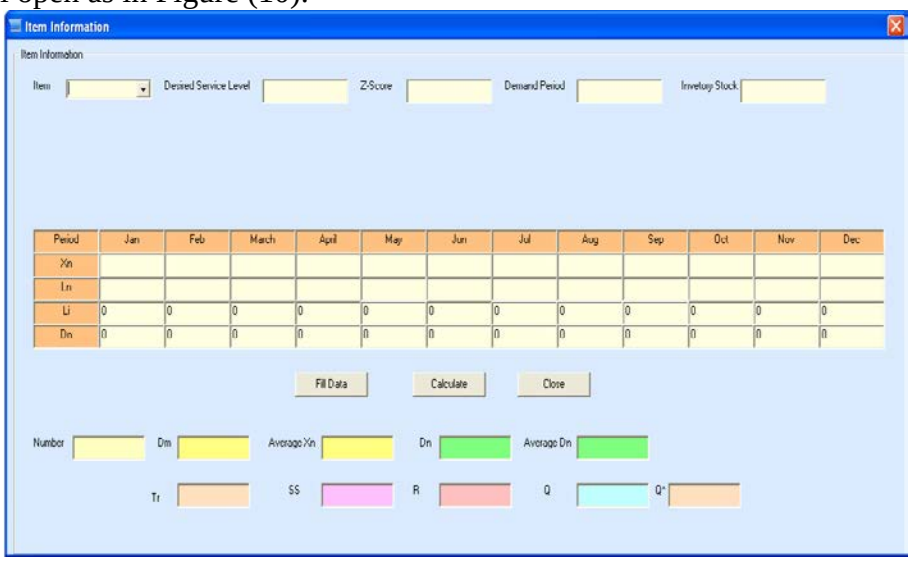

Figure (10): Item Information utility window.

This utility is used as a report to record the demand on the product during specific period of time at almost for a year (12 month) as shown in the table within figure (10) which illustrates :-

- Desired service level box: In this box user can enter the desired (preferable) value of the service level adopted by the company. While service level represents the expected probability which does not hitting a stock-out [13&14].
- Z –score box: When clicking this box, a specific value will appear ; this value represents the appropriate value that corresponding to the value that was chosen by the company in the previous box (Desired service level box) , depending on table for this relation stored in a database was built to save and call it when needed.
- Demand period box: In this box, can enter the required value for the time between orders (in days) and this value may change from period to another depending on some factors such as customer desires and requests.
- Inventory stock box: To insert how many units of this product exist in the store.
- The table: Includes:-

  * Period: Refers to the months (from January to December). This means user will take the value (quantity) of the demand monthly.
  * X_n: Represents the amount of demand each month.
  * L_n: Represents the time from the product request to deliver it to the client (lead-time) in month.
  * L_i: represents the value of L_n (lead time) but in days, where ($L_i = L_n * 30$)
  * D_n: Represent the daily demand on the product and $D_n = X_n/30$; to find approximately how many units of the product which were demanded in each day depending on the full monthly demand.

Also, in this table user can enter values using keyboard for the X_n and L_n variable and then when clicking on the fill data key the L_i and D_n cells will be filled automatically depends on the ratio:-

$L_i = L_n * 30$ and $D_n = X_n/30$.

Note: It is possible to enter values for X_n and L_n for all months or for some of them as needed by clicking on the calculate key. This will allow boxes at the bottom to fill automatically with appropriate value that refers to the title of the box depending on a specific equation for each symbol on each box as follows:-

- Number: To calculate the number of cell that to be filled.
- D_m: Represents the standard deviations of the demand X_n as in equation; $[\sum (X_n - \text{Average } X_n)^2$ divided by a number$]^{1/2}$.
- Average $X_n = (\sum X_n) / \text{Number})$.
- D_n: represents the standard deviations of demands in days D_n as in equal $[\sum (D_n - \text{Average } D_n)^2$ divided by (a number)$]^{1/2}$.
- Average $D_n = (\sum D_n / \text{Number})$.

- T_r (time ratio) = [L_i / demand period] $^{1/2}$. This factor will be calculated if the demand period doesn't equal the lead-time and it is used in safety stock calculation as follows:
- SS (Safety Stock) = Z-Score * D_m * T_r.
- R (Reorder Point) = Average D_n * L_i +Z * D_n * $(L_i)^{1/2}$.
- Q (Order Quantity) = [Average D_n * (Demand period + Li)] + [Z * D_n * (L_i + Demand period)$^{1/2}$] – Inventory Stock.
- Q* (Optimal Order Quantity) = Z-Score + Average X_n.

(7) Click on the (Situation Type) title: The situation utility window will open as in Figure (11).

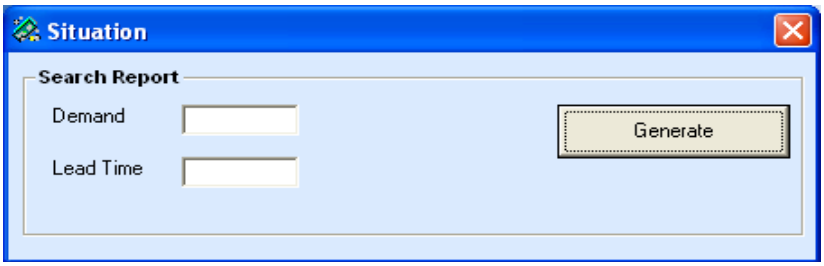

Figure (11): Situation Type utility window.

This window represents the search report; it is used to determine if the demand on the product within the normal boundaries, values in the terms of demand quantity and/or lead time, because if the demand and/or lead time contrary with normal situation this means there is an emergency situation. The company could face an addition production cost. If the company has agreed to perform this emergency demand, this requires an additional cost for overtime work. The normal value of demand and lead time for the normal situation of the company will be stored in program as a reference for any new demand. In this window there are two boxes:-

- Demand box: To insert the quantity of the product that was requested
- Lead time box: To insert the time from the product request until it delivers to the customer who demands it. When clicking on generate key the values which are inserted in these boxes will be compared with these were stored in the program and a message box will appear like as in Figure (12) to tell which situation will go.

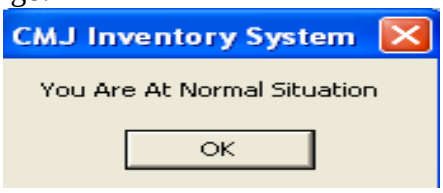

Figure (12): Comparing messages window.

If the values in these boxes are the same as that stored in the program, the program will send normal situation as in figure (13).

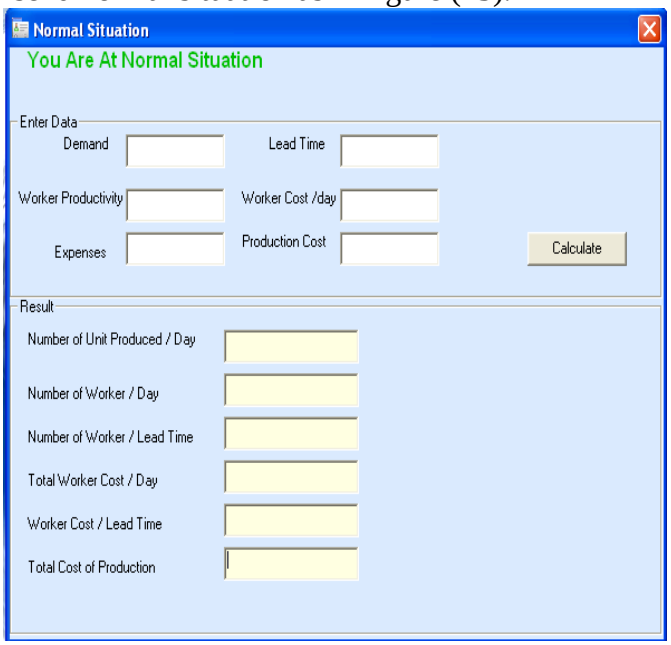

Figure (13): Normal Situation window.

But if these values doesn't equal with those stored in the program then the program will go to the emergency situation window, as in Figure (14).

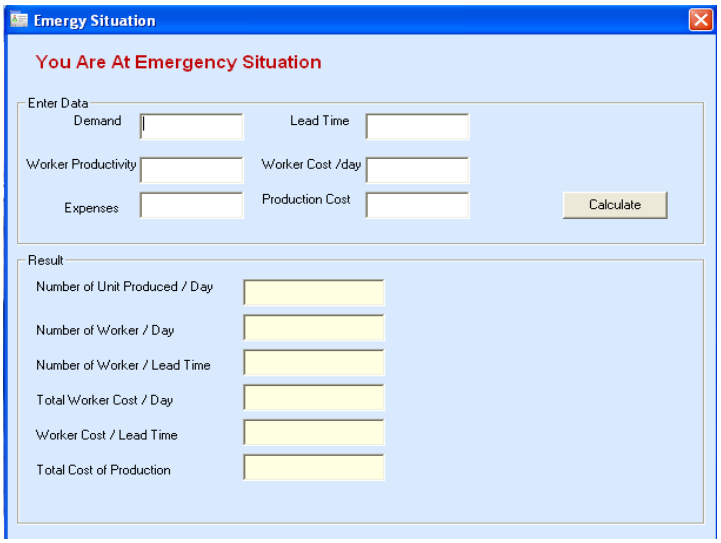

Figure (14): Emergency Situation window.

In the previous boxes as shown in figures (13) and (14):-

- Enter data parts:-

** Demand: Numbers of units requested.

** Lead time: Time from request demand to deliver.
** Worker productivity: Number of units per employee per day.
** Worker cost/day: The wages of the worker for each working day.
** Expenses: Includes: Insurance, transfer expenses, taxes and etc.
** Production cost: How much does it costs to obtain the final product (raw material cost, for example).

After clicking on generate key the user will go to the second part (results part) in each box as in figures (13) and (14):-

Number of unit produced/day = demand/lead time.
Number of workers/day = (Number of unit produced/day)/worker productivity.
Total worker cost/day = (Number of workers/day) * worker cost.
Worker cost/lead time = (Total workers cost/day) * lead time.
Total cost of production = Workers cost/lead time + Expenses + Production cost.

Case Study:-

Hussein bin Abdullah II Industrial City.

Jordan Chalk Manufacturing Company:

Jordan Chalk manufacturing company is a Middle Eastern company located in south of Jordan (karak). It manufactures exporters and suppliers of all types and shapes of chalk for:

* School, institutes and universities.
* Child hoppy (kids).
* Small and medium enterprises, shops, restaurants and industrial markers.

From the discussion with the company manager and from his answering to questions, also from the weekly reports about the company work the following informations were collected:-

- ✓ In this company all the departments are located in the Jordanian industrial companies such as production, procurement, financial and marketing department… etc. There is few staff controlling these departments.
- ✓ Storage in the company:-
  - The company has three contiguous stocks (their names are the same names of the substances were stored in them): Raw materials such as (bentonite that stored as (kg) unit , and motors spare parts that were stored as (number) units, packaging such as (internal cardboard ,external cardboard and bottles that were stored as (number) units and the final product stock (chalk as packet or box that was stored as number) units.
- ✓ Inventory management in the company:-

- The larger value (quantity) of material exists in the raw material stock because the shortage of these materials represented a real problem for the company where some of these materials require a long time to be supplied to the company.
- The final product store is the smaller one of the three stores because it doesn't prefer having a lot inventory which means frozen money.
- There is only one stock supervisor for all stocks; the contact with him is through interfacing, mobile phone and through online reports (through internet services).
- Weekly inventory of the warehouse is made to follow the actual quantity of materials and spare parts, while keeping the minimum level of the materials to prevent stock out state that affect negatively on the company work.

- The warehouse deals with three suppliers for the materials and spare parts because if one can't provide material the second one may provide it and so on. But the warehouse depends on one supplier with 90%, the second one with 5% and the third also with 5%.
  - If the company has encountered a sudden (unexpected) demand, the company is able to implement only one container but if the request is more than one, the company will be unable to provide it.

✓ Other information:-

- The company produces about 10 containers (28 Ton) of chalk each month (demand quantity).
- The company produces 1 container each three days.
- The container costs approximately 12500 JD (without worker cost).
- The number of the employees in the company = 90.
- Each employee costs about 300 JD monthly.
- Each employee has productivity about 300kg / month.
- Over time work is about 3 hours.

After entering this information that has been collected from the company, the present work program needs the followings to be obtained:

>> Add new store as in figure (15):-

In this window store name (s4), the supervisor store name (Ahmad), the store location (Karak/Mutah), the phone number of the supervisor and (store for the final product) as a remark has been added.

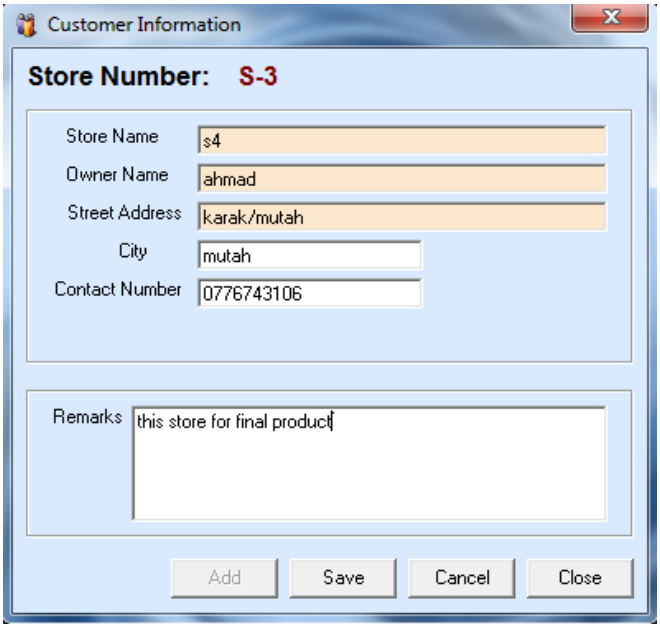

Figure (15): Add new store for Jordan Chalk.

Then save the information that was inserted.

>> Add new product:-

- Adding product name and store name in the category group as in Figure (16- a):

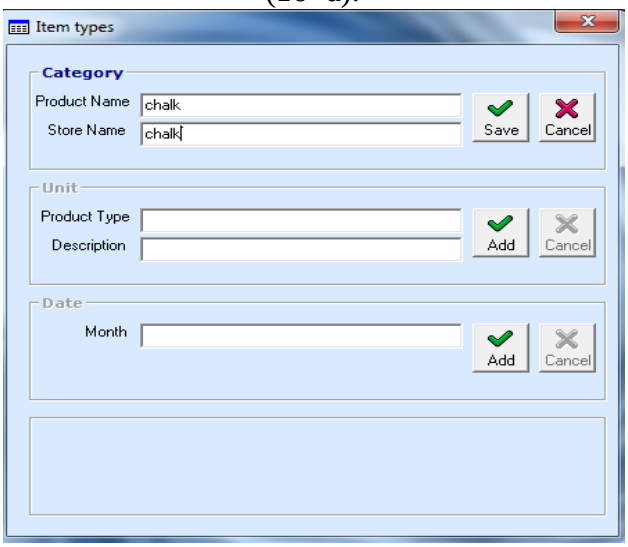

Figure (16-a): Add new product for Jordan Chalk.

- Adding product type and its description in the unit group as in Figure (16 - b).

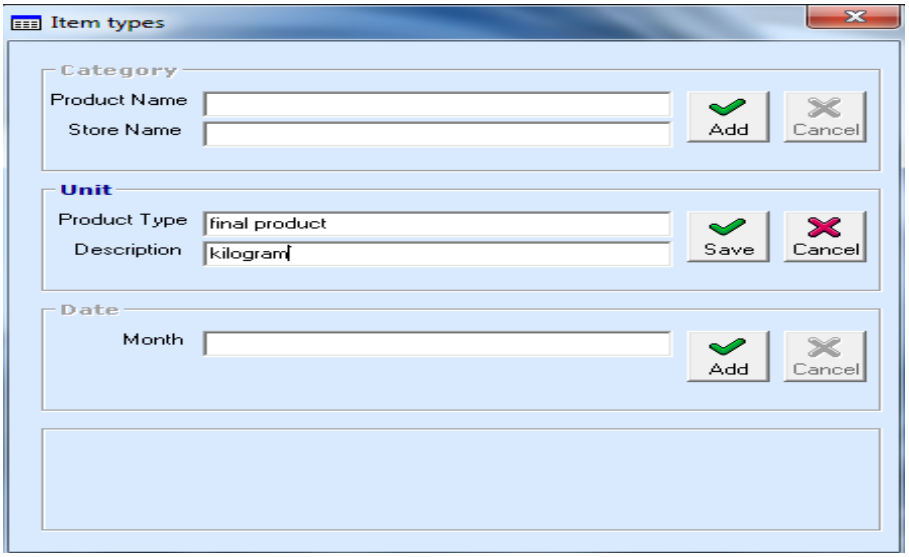

Figure (16-b): Add new product for Jordan Chalk.

- Adding the month of this product as in Figure (16-c).

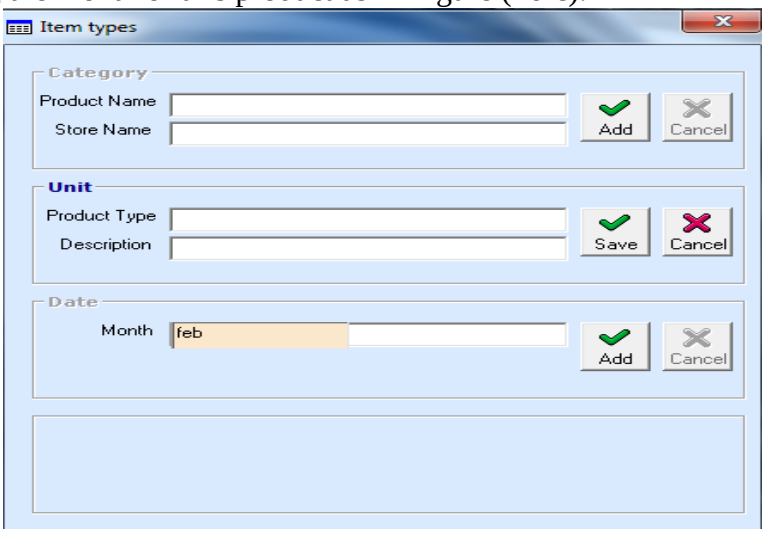

Figure (16-c): Add new product for Jordan Chalk.

>> Add item information as in Figure (17):

The product name is a chalk and it was stored in the store in February. This is shown in item type parts as in Figure (17) .The product consists of 5 materials such as (bentonite), no stock of this product exists in the store; each container of chalk costs about 12500 JD (without employee cost) and the lead time equal one month. These informations are shown

in detail part in figure (17). All these informations will enter after clicking on add key, to save them just press the key.

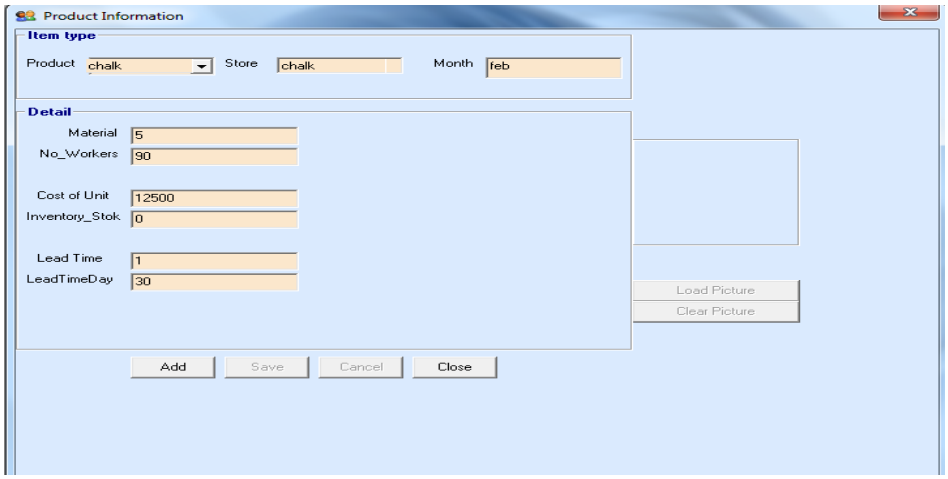

Figure (17): Add item information for Jordan Chalk.

>> Item report (Item calculations) as in figure (18).

Figure (18): Item calculation for Jordan Chalk.

In this window (Fig. 18) the demand was entered for only 5 months because they will give the same results for demand on 12 months (the demand amount is fixed and equals 28 ton). From the window in figure (18) will find the followings:

- Lead time in days = 30 because L_n = 1 month.
- Daily demand = 933.33kg.
- Number of cells to be filled = 5 cells.
- Average monthly demand = 28 ton.
- Average daily demand = 933.33kg.

- Standard deviation of monthly demand and daily demand both = 0.0 because the difference between demand amount and average demand amount equals zero.
- The SS value equals zero and this means the company doesn't have any safety stock quantity. This means that the company doesn't have any excessive amount of stock to meet the unexpected demand during the period of supply. This value indicates that the company really in a big problem especially when it receives additional demand (it is more than 28 ton) because the company will not provide any of these demands because it doesn't have any safety stock in its stores.
- The optimal order quantity = 28 ton.
- Reorder point = 28 ton, the amount of the product that when the inventory level reaches to a new request of the product which must be organized (Each month the quantity equals = 28 ton).

>> To calculate the total cost of producing 28 ton as illustrated in the Figure (19). Just by entering the demand quantity 28 ton with lead time = 30 days. In order to determine the situation type of this demand and calculating the total cost of production, press the generate key only.

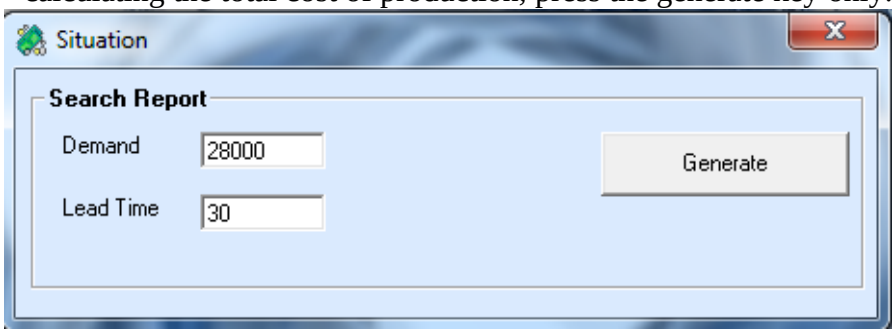

Figure (19): Situation type window for Jordan Chalk.

After pressing on the generate key, the following message will appear as in Figure (20).

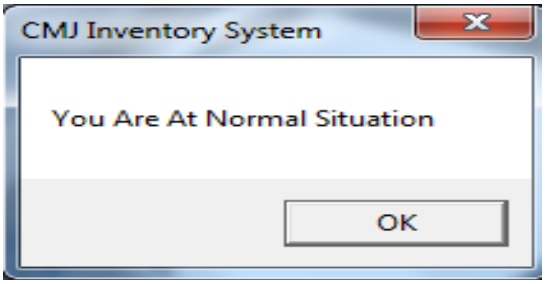

Figure (20): Situation of decision message for Jordan Chalk.

Pressing on ok key the following window will appear as shown in Figure (21) which indicates that the demand quantity which = 28 ton in the normal area .

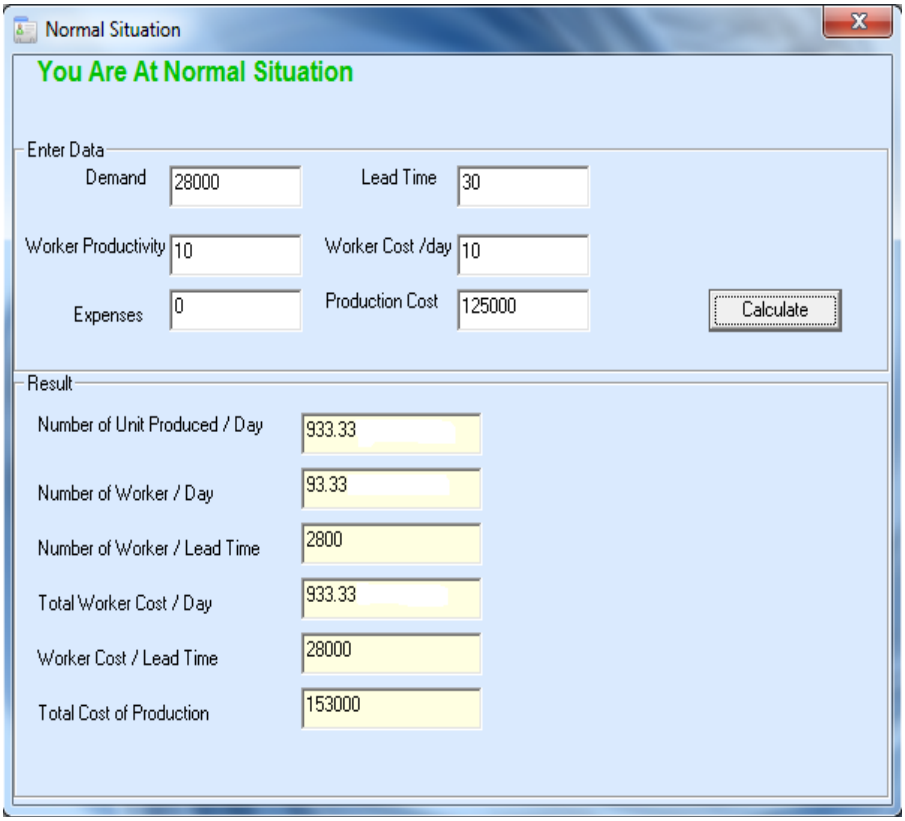

Figure (21): Normal situation for Jordan Chalk.

From this window (Fig. 21): For the demand quantity = 28 ton with lead time = 30 days were entered in data part in addition to the productivity of the employee = 10 kg each day, employee cost for each day = 10 JD, the expenses = 0.0 (because it is included in the production cost for this case) and the production cost = 125000JD for 10 containers of chalk.
In the result part will be as in Figure (21):
* Quantity produced each day = 933.33kg.
* Number of employee each day about 93 employees.
* Total cost of the employee for the total lead time = 28000 JD.
*Total cost of production (10 containers) = 28000 + 125000 = 153000 JD.

If the company receives an additional demand (1 additional container of chalk), this means the company must produce 28 ton + 2.8 ton = 30.8 ton and it deals with this as emergency situation (cost increasing) as in Figure (22).

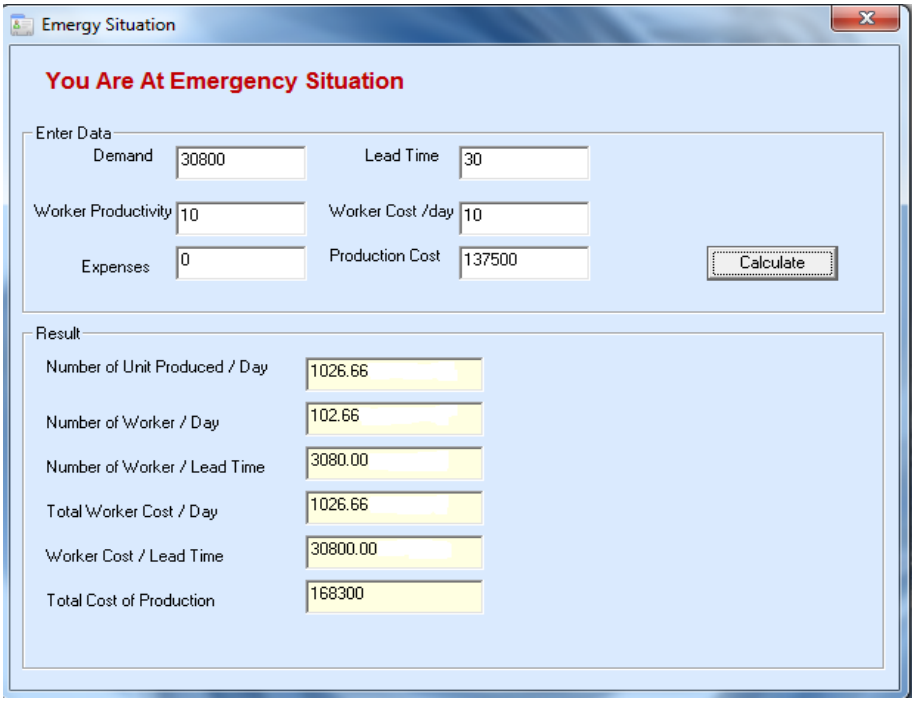

Figure (22): Emergency situation for Jordan Chalk.

From this window (Fig. 22):-

- ☒ The demand quantity is increased compared with the quantity in normal situation.
- ☒ Production cost of the demand (137500JD) is increased compared with the normal situation (125000JD).
- ☒ So that the total production cost (137500 +30800 =168300 JD) which is increased compared with normal situation (153000JD) because the worker cost is increased from 28000 JD for a demand = 28 ton to 30800 JD for a demand = 30.8 ton. This increasing is due to the overtime work. It is worth to mention that the company rejects a large amount of demand because it can't deal with them (there is no inventory in its store). So, the present work program will help the company in managing inventory and it will provide a value for safety stock, reorder point and the ordered quantity that is required to deal with unexpected demands, preventing stock out case or inflation inventory, also the program will help the company in calculating the total cost of production.

Drawbacks:-

The program was tested on only one item the final product in Chalk Manufacturing Company because this company didn't give any information

about the other items stored in their stores (such as raw material, spare parts and semi finished) but it gave general information about the final product only. This information was considered as confidential. While the present work designed program can be implemented to all item types (raw materials, spare parts and final product).

Conclusion:-

The main points which can be concluded from this works are:-

1- An inventory management controlling program was designed and tested in this work by implementing it on a case study which is the Jordan Chalk Manufactory company.

2- The main objectives of the program are to keep the inventory within the acceptable level for the business sector (any type of production) and to deal efficiently with emergency cases to predict the time or the additional cost due to these critical situations.

3- The present work program can help any company in solving the inventory problems and can deal with uncertain demand of product, by entering the required demand quantity for each month, so the program can manage the company's inventory as follows:-

(I)-Safety stock amount: Depending on the average demand on product the program can determine the excessive amount of stock that the company keeps it to meet the unexpected demand.

(II)-Reorder point: Also the program can calculate the amount of the product that when the inventory level reaches to it, a new request of the product must be organized in order to ensure that it can arrive before the stock reaches to the safety stock level. Determining it can help in minimizing the chance of stock out and reducing the amount of money tied up in inventory.

(III)-Order quantity: The program will provide the amount of product in each order.

(IV)- The value of the service level can be determined, which represents the probability of being able to service incoming order (or demand) during one lead time. Also it is an important variable for calculating the appropriate safety stock (SS). When its value increases the safety stock value also increases.

(V)- Any additional demand in any month with any quantity can be managed depending on the value of SS, R and Q taking the desired service level value into account.

(VI) -In case the company doesn't have any stock in it stores (i.e. Inventory stock = 0.0) .So that, this situation represents an emergency situation (challenge) for the company and in order to provide it to the

customer must carry on additional cost (overtime cost) of the actual cost for each container which must be produced in the emergency time.

(X)- By using this program, the company can meet the demand safely because it will has the required safety stock quantity and has the perfect amount of the reorder point that help the company to avoid the stock out case or inflation in inventory. Also keeping historical data about this quantity of demanded will help the company to predict how it can deal with situations like this in future.

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Compromises in Healthcare Privacy due to Data Breaches

S. Srinivasan, PhD
Distinguished Professor of Information Systems
Jesse H. Jones School of Business
Texas Southern University, Houston, Texas, USA

Abstract

Healthcare privacy is essential for people because any leaked information could be used against the interests of the person in providing healthcare. This is especially true in countries where the individual is responsible for getting the health insurance. In places where the healthcare coverage is included as national policy, such leaked information could be used to deny care. Healthcare industry is highly data intensive and people would need healthcare coverage in places beyond their home base. Making healthcare data available to service providers facilitates rendering quality care. This necessitates centralized storage of such data for easy access. Hackers are motivated to seek out centralized data stores due to the volume of data that they could get. Leaked data could be used by unscrupulous individuals to offer treatments that might help the people. Since such individuals are desperate to get treatment they fall victim to such scams. In this paper we first analyze some of the major data breaches in healthcare globally. We include at least one country from all the continents to see how the policies and protections for health data differs. Then we present technology-based solutions to prevent such breaches. We conclude the paper with several policy guidelines to show how the holders of health data could provide adequate data protection to prevent data breaches. This has become all the more essential because the most often breached sites are in healthcare and stolen data are used to pry on unsuspecting and vulnerable people.

Keywords: Healthcare, Privacy, Data Breaches, Policy, Security

Introduction

Organizations tend to centralize their data storage for maintaining control, manage data integrity and protect data. In many cases data protection from unauthorized access is a compliance requirement because of national law. In USA, the Health Insurance Portability and Accountability

Act (HIPAA) was enacted in 1996. It was further enhanced in 2009 by the Health Information Technology for Economic and Clinical Health (HITECH) Act. These two Acts together require all healthcare providers to assure confidentiality of health data and take adequate measures to ensure security of such data. Similar laws have been enacted in United Kingdom (Data Protection Act), Europe (EU Directive 95/46/EC), Canada (Personal Information Protection and Electronic Documents Act) and Australia (Privacy Act). In spite of these Acts, there have been numerous data breaches at healthcare institutions around the world. Hackers target the health data because it does not get the same high level of protection that is afforded the financial sector data. With centralization, hackers are tempted to target the ones that are easy to tap and gather large volumes of data. The frequency and amount of data loss has created the feeling among the general public that occurrence of data breaches is the new norm in the industry.

Typically in a healthcare setting there are several different groups that are responsible for generating health data for their patients. In a hospital the patient data is gathered, the laboratories generate data from the many tests that are performed, the pharmacy is responsible for keeping up with the medical prescriptions for the patients and the distribution of drugs. In countries where a third party insurance provider is involved, there is one more source of data coming from the insurers. These subunits that generate data are not usually well integrated. This problem is typically referred to as "islands of data". This problem has persisted for many years. With the great advances in Information Technology, today it is possible to integrate all these sources of data. Protecting such hyperlinked data is essential as otherwise too much personal health information about a patient will be released without the knowledge and consent of the individual. The great risk posed by such unauthorized disclosure is that once a person's health data is released by whatever means, it cannot be retaken. In some instances the care givers may not provide the individual with the same level of dedication and care once their health data is disclosed to the wrong individuals.

In this paper we look at the practices in several countries around the world with regard to the healthcare data protection. One of the drawbacks of unauthorized release of health data is that some unscrupulous individuals might target the unsuspecting and vulnerable people with offer of help for their maladies. It is human tendency to react positively for such possibilities and get disappointed when such bad actors abuse the information that they accessed illegally. We offer guidelines to protecting health data from data breaches.

Data Breaches and Tactics Used

Data breaches have become very frequent and millions of records have been exposed. The types of data disclosed include name, address, phone number, email address, password, credit card data, health history, treatment locations, medications used, etc. Some of these data are classified as Personally Identifiable Information (PII), Personal Health Information (PHI) and Payment Card Industry (PCI) data. Organizations that collect any of these types of information have a greater need to protect PII, PHI and PCI data. Failure to do so will result in significant financial penalties. However, the existing laws have not curtailed the data breaches in the healthcare sector. In fact, one of the most breached sectors is the healthcare sector. The 2015 Data Breach Report by Verizon lists the following in order of significance (Verizon Healthcare Data Breach Report, 2015):

Healthcare	7. Entertainment
Education	8. Professional
Public sector	9. Manufacturing
Hospitality	10. Technology
Financial services	11. Administrative
Retail	12. Transportation

This report covered 25 countries and reported 1931 incidents involving 392 million records. Moreover, this report points out that PHI data breaches stand out from other breaches in that the percentage of incidents that were insider threats is equal to external threats to the businesses. Healthcare organizations should treat the data breaches in the healthcare sector as a significant threat because such web attacks are on the rise.

In this section we highlight five major data breaches in the healthcare sector or related action from around the world. The most recent major data breach in USA occurred at Anthem, a very large health insurer. This attack that happened in February 2015. It resulted in PII data being stolen for 78.8 million customers. However, no medical or financial data was stolen in this hack. Since PII data could be used for identity theft, the impact of this data breach is enormous. Also, hackers use the stolen data to commit financial fraud. It is also used in some instances to perpetrate hoaxes on the vulnerable individuals because are very conscious of their health. Unlike stolen credit card data where the stolen card can be deactivated and replaced, stolen health data cannot be withdrawn. The information contained in the health data is permanent. In 2014, the Community Health Systems was attacked by hackers from overseas. It resulted in the unauthorized disclosure of information about 4.5 million customers. Community Health Systems operate 207 hospitals in 29 of the states in USA. Thus, the impact of this breach is quite widespread. Another data breach that occurred in 2014 was in England. The National Health Service (NHS) in United Kingdom reported that data breach incidents

in healthcare doubled in 2014 from 2013. In 2013, there were a total of 91 data breaches reported and in 2014 it jumped to 183 incidents. Financial loss due to data breaches exceed $10 million in UK. Europe had over 30 major data breaches that resulted in over 300 million health records compromised. These breaches ranged from losing hardware such as a USB key or printed copies of patient information to uploading sensitive information to unauthorized websites.

In 2012, the state of Utah in USA suffered one of the easily preventable data breaches in its Medicaid database that contained data for nearly 750,000 people. In this breach, the state used a computer server that had the original default password for the hardware. Hackers who tried the default password succeeded and went on to steal health data of Medicaid patients. The government spent over $9 million to remedy the situation. In Europe and Australia, the concern presently seems to be over the breach notification requirements. Unlike USA, in Europe and Australia there are no strict notification requirements when a breach occurs. The primary reason for the push towards legislation to require customer notification is because it would spur the data holders to take greater precautions to prevent data breaches in the first place. The goal of the notifications is to protect the customer privacy (Howard, 2014). In the case of USA, the notification requirements are legislated at the state level. Out of the 50 states, 47 states have enacted varying levels of requirements for notification.

Many of the healthcare data breaches occurred due to theft of laptops or data loss, not hack by criminals. According to the California Attorney General Report, 70% of healthcare data breaches occurred due to loss or theft of laptops (Attorney General, 2012). This trend is quite prevalent in many of the healthcare data breaches because the data keepers do not provide adequate protection because of cost. Majority of the healthcare institutions in USA operate as non-profit and so they are constrained for funds. In other countries where nationalized healthcare is the norm, funding is constrained because of taxpayer support of healthcare. Consequently the major reason for frequent breaches of data in healthcare industry is attributable to lack of financial resources.

USA government and many private entities spend an enormous amount of money on healthcare. Also, they are repositories of information that are not highly protected. Consequently hackers target such institutions for attack. Moreover, monetarily health care records are more valuable to hackers than credit card data according to a report by the US Federal Bureau of Investigation (FBI). In US, the HITECH Act requires that any data breach involving 500 or more people at a healthcare facility must be posted by the Department of Health and Human Services in the Wall of Shame portal (Wall of Shame, 2015).

Best Practices to Protect Healthcare Data

Often data breaches occur due to lax enforcement of policies. Regulators in US and UK have realized the importance of security measures needed to safeguard patient data. An analysis of the various breaches shows that in some cases the patient data was sent erroneously to third parties outside the organization by mistake. In other cases it was noted that employees handling critical healthcare data did not receive adequate training in protecting such data. These are aspects that could be addressed by enforcing the organizational policies to safeguard data. However, a new trend has emerged as the cause for data loss. These are not strict data breaches, but nevertheless confidential health data was leaked intentionally by employees. Since this comes under the case of insider access to data, normal access controls would not be sufficient to prevent data leakage. The case in point is that an insider with legitimate credentials accesses the data and intentionally shares it with former employees who are disgruntled. When the employees access the health data they are within the scope of their employment and not violate the Health Insurance Portability and Accountability Act (HIPAA). However, when they send data outside the organization then they violate HIPAA requirements. To prevent such occurrences of data leakage the organization should undertake behavioral analysis for all its employees with access to sensitive information. In order to enforce this aspect of preventing data leakage by insiders, organizations should do compliance-based auditing and start using behavioral analytics. People causing breach stay within parameters of access but their pattern of access will be different from the need they have for work. One such insider access in East Texas resulted in data leakage in 2015. In US, the HIPAA was strengthened in 2009 by the HITECH Act which held the Business Associates of a healthcare provider to the same standard as the HIPAA Covered Entities in protecting patient data. Because of this requirement Cignet Health was fined $4.3 million for HIPAA violation.

Preventing data breaches should be the goal of healthcare organizations. In order to accomplish this the employees must be trained. In US, all employees of healthcare organizations are required to be trained and HIPAA compliant. However, 29% of healthcare employees did not receive any training as required. In UK which has a similar requirement under their DPA, 48% did not receive any security training. Another best practice is to do background checks on employees entrusted with access to sensitive health data. In reality this is not adhered to strictly. In US, percentage of healthcare employees receiving background checks is 60% and in UK it is 49%. This shows the need to enforce this policy in order to protect health data.

Another recommended best practice is log monitoring. Attackers often use the same IP addresses and domain names to attack multiple targets.

So, priority processing of logs will enable the businesses to monitor and know the malicious IPs. In order for this to be possible, the businesses should be willing to share data pertaining to a breach and the way the business handled the attack. This is usually available through the Incident Report but many organizations do not make available such a report. Logging all access is critical for detecting intrusion. However, logs could generate 5000 entries per second since several equipment are programmed to access the system. Because of the abundance of data being generated rapidly, it is difficult to monitor all logs manually. There should be plenty of automation in log processing and alert generation. Integration of security controls will provide a single source to monitor for discrepancies. Typically networks are color coded based on the type of data that they handle. A red network suggests lower security monitoring and black network suggests higher security monitoring. Financial systems which contain PII, PHI and PCI all reside in the black network. Usually a jump server is used to connect the red and black networks.

Threat intelligence monitoring will help healthcare institutions to be proactive. Third party threat intelligence monitoring from FireEye or similar service will help the healthcare organizations to use their resources better and implement security controls (FireEye, 2015). Compared to other businesses, healthcare organizations tend to have fewer IT security resources. Creating a strong BYOD (Bring Your Own Device) policy is essential now because many employees tend to use their devices like cell phones more at work. Use of bidirectional authentication will help in this regard. Organizational policies should prohibit storage of data locally in devices such as laptops and flash drives. Such devices are the ones lost or stolen most often and this practice facilitates data loss, not just data compromise. Businesses should have cloud storage policies as well as data backup and recovery exercises.

Often data breaches occur because an unauthorized person gained access to sensitive health data. In order to protect such data healthcare organizations should employ Identity and Access Management. This requires that access be granted only to employees with the need to perform their job duties. Using security and usage policies is a better way to control data access. The use of usage policies will help with privileged user access to data. Enforcing automatic logoff from a health source when such data user is inactive even for two minutes is essential. To prevent annoying legitimate users such logoff should be preceded by a warning. When the device is inactive even for one minute, it should force the screen display to disappear in order to protect the privacy of healthcare data. Using centralized exchanges to share health data prevents the need to actually transmit the data. Often such data transfers are vulnerable from being grabbed in transit

and sometimes such data are sent to the wrong person by mistake. Another way to protect health data is by isolating such data from the rest. This is done by creating subnets from a larger network so that there is segmentation of data. As mentioned earlier, healthcare organizations should use subnets for their patient portal, hospital record of patient data, laboratory data, pharmacy data and where relevant, health insurer data. Once again, centralized data storage gives the ability for authorized users to access all the relevant data.

One of the reasons for a successful attack over the web occurs due to users using plaintext database credentials in various web application configuration files to log into the database management system. In healthcare systems, updating the operating system to provide protection is not easy because many of the applications used by healthcare systems will not function in new operating system environment. Also, in US medical equipment are certified by the Food and Drug Administration (FDA) for use with an operating system. When the operating system is updated it is not easy to get the new certifications from FDA for old equipment. Healthcare organizations lack the resources to modify the applications with any new operating system.

Conclusion

Data breaches have become too common in general and in the healthcare sector it has become too frequent. Millions of customer records have been compromised due to insider threats, loss of portable devices with confidential data and lack of policy enforcement. This problem is not limited to any one country as explained in the details of attacks. The privacy expectations are different among countries and so the service providers should be prepared to modify their procedures to the legal requirements in the various jurisdictions that they do business. Developing adequate security policies and enforcing them is highlighted in the paper.

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Health Care Workers And Patients Safety In Nursing Homes

J. Sepp, MA
Tallinn Health Care College, Tallinn, Estonia
K. Reinhold, PhD
M. Järvis, PhD
P.Tint, PhD
Tallinn University of Technology, Tallinn, Estonia

Abstract

The aim of the study was to review the literature in the area of health care of nursing homes using meta-analysis and to develop a framework for improvement of patients and caregivers safety. The method used: a literature search conducting databases EBSCOhost, Academic Search Complete, Business Source Complete, Health Source – Consumer Edition, Health Source: Nursing/Academic Edition and Retrieval System Online. The key words in the internet search were "safety climate in health care" and "worker and patient safety". Limitations were English language, full text, human, the years 2006-2015. We eliminated studies that were specific to industry, military, aviation, disease, medical speciality, technologies, or hospital departments/units. As a result, the literature overview was achieved that provides the sources for a good care and enables the patient safety; from the caregivers side we need the workers who are committed to provide a good care and are non-punitive and do can organize the blame-free environment in the nursing homes. The good safety culture in nursing homes is achieved if the workers are able to speak freely about accidents and eager to learn from errors, mistakes and hazards. The authors of the current paper have created a model showing the main components of safety climate which help to provide a good care and ensure patients and workers safety in the nursing homes.

Keywords: Health care, safety climate, workers and patients safety

Introduction

Many researches, policymakers, providers are looking for the answers to the question: „How organizational conditions, structure, management, and other processes relate with patient (Stone et al., 2008) and worker (Flin, 2007) safety?" and the quality of health care providing

(Lövgren et al., 2002). Health care sector is one of the most difficult and dangerous sectors where we can find very high rating of fatal and nonfatal injuries (Trinkoff et al., 2005). Since 2000, when the Institute of Medicine in US published a report on the seriousness of the medical errors, a lot of institutions in US, UK, Canada (Fleming, 2005), in Sweden (Lövgren et al., 2002) etc. have tried to find a new way to build an effective health care system (Kohn et al., 2000). The goal is to minimize the risks (Cooke, 2009) and costs (West et al., 2006). Kohn et al. (2000) declared that patient safety culture is the main element to provide high-quality service and patient safety in health care sector. Other researchers have found that stress-free environment, emotional support from the side of supervisors; the professionalism and involvement in the decision-making processes were identified as factors, which help to provide a positive climate in the workplace as well as the productivity of health professionalism (Dionne-Proulx and Pepin, 1993).

The researches have also concentrated on the patient's safety (Blegen et al., 2005; Stone et al., 2005; Bonner et al., 2008; Singer et al., 2007). But not only patients are injured; the health care workers have a number of nonfatal occupational injuries, illnesses, job transfer and restrictions that cause high price for public health care system and for employees (Flin, 2007). The positive environment (West et al., 2006) and high level of workers wellbeing have a good effect to provide high quality health care service (Flin, 2007). Good working conditions for the employees are very important factors for providing good care connected with the determined country public care policy (Lövgren et al., 2002). In the organizational level, Flin (2007) has found that patient's safety is related with the worker's safety. He showed that the positive level of worker's physical or mental health can be related with the patients' well-being. To improve quality and safety in health care system is necessary (Baker et al., 2004), organizational culture and safety climate have influenced as an important impact factor promoting both, the care workers well-being and the patients safety (Yassi & Hancock, 2005; Piirainen et al., 2003). The organizational safety climate is a part of the organizational climate (Schneider et al., 2013), which has been defined as organizational members have shared perceptions of policy, procedures and practice in connection to safety in the organizations (Zohar, 1980). Stone et al. study (2008) demonstrated positive relation between the occupational and patient safety climate in health care. Eklöf et al. (2014) study showed that the conditions that are of importance for patient safety are important also for workers' safety.

Safety culture is a complex meaning of individual and group values, attitudes, perceptions, competencies, and the model of behaviours that cause the commitment and determine the competency of an organization's health

and safety management (ACSNI, 1993). The aim of the safety culture is to create a normally acting mechanism where workers are continuously informed about the new risks and hazards in their workplace (Ostram et al., 1993). Safety culture in the health care should include true reporting system, intervention actions based on the reports, flexibility, and learning from experience (Blegen et al., 2005). Safety climate is the measurable component of safety culture (Flin et al., 2000) which is related to the employees shared perceptions of safety policies, procedures and practices in their unit and in the organization at large (Zohar et al., 2007). Gershon et al. (2004) have found that organizational climate is related to the perceived working conditions and has effect to the health care workers and patients' safety; he has created an integrative model for health care working conditions influencing the organizational climate and safety (Stone, 2005).

The identification of the importance of safety culture factors has stimulated in a significant amount the research aimed on the developing and validating the safety culture instruments including safety climate as a quantitatively measuring component in the developing of the overall culture considering the current character of an organization (Fleming, 2005).

In the current review, the authors consider the previous studies to identify the factors which prove that quality of the service in health care, connected with both, patients' and workers' safety. Many authors propose theoretical frameworks separately for workers and patients safety, but the current literature review has a hypothesis that more effective is to provide the health care system designed to cover the patients and workers safety together.

The goal of the current paper is also to improve the safety climate components as the main factors to make changes in the organizations' policies and procedures. The goal is important, as created the support from the side of the hospital leadership, the good safety culture and climate offer the high quality health care service ensuring the patients' and workers' safety, thereby minimizing the costs and design an effective health care system.

Method

The study design was an overall literature review using meta-analysis to develop the framework of the patients' and care workers' safety in nursing homes and find the key concepts of providing good care for patient and guarantee the care workers' safety. To increase the reliability and validity of our model, we created a conceptual framework based on patients and workers' safety and based on the context of Flin (2007).

A literature search was conducted using databases EBSCOhost Web, included Academic Search Complete, Business Source Complete, Health

Source – Consumer Edition, Health Source: Nursing/Academic Edition and Retrieval System Online (MEDLINE, 2015). Key search words were "safety climate in health care" and "worker and patient safety". Limitations were English language, full text, human, the years 2006-2015. We found 98 scholarly journals articles that include the initial criteria. As the next step, we narrowed the review; we limited the criteria to include only the academic journals and books. After that limitation, 57 studies remained. We eliminated studies that were specific to industry, military, aviation, disease, medical speciality, technologies or hospital departments/units (nine studies).

Results and discussion

In the health care we found next features of safety culture: management/supervisors, safety system, risk perception, job demands, reporting/speaking up, safety attitudes/behaviours, communication/feedback, teamwork, personal resources (e.g. stress) and organisational factors (Flin et al., 2006). Singer et al. (2003) identified seven elements of safety culture, which help to guarantee the patients' safety:

1. leadership commitment to safety;
2. organizational resources for patient safety;
3. priority of safety versus production;
4. effectiveness and openness of communication;
5. openness about problems and errors;
6. organizational learning;
7. frequency of unsafe acts.

We found seven studies where researches have investigated the safety climate influence to both, patient and worker safety in a health care sector (Table 1).

Table 1. Safety climate and patient and workers measures in health care

Authors	Method	Results
Hofman & Mark, 2006	Quantitative study and documental analyses	A safety climate related with medical errors, nurses back injuries, patients and nurses satisfaction and patient perceptions of nurse responsiveness. The safety staff and managers need to design the environment where workers can learn from errors.
Flin et al., 2006	Literature review	Measuring safety climate in health care helps to diagnose the underlying safety culture. Instruments have to be standardized and give to the managers results, which help to design effective safety management system and organize the interventions.
Flin et al., 2007	Literature review	Different cultural or motivating factors that determine the health care employees to behave safely influence on the level of patient's safety. Health care is one of the largest areas where both, the patients and workers injuries have negative affect for the quality of health care

		services and need to investigate the safety climate theory and it influences on the whole system.
Stone et al., 2008	Literature review	Patients' and employees' outcomes are affected by the organizational climate. Connections between the safety and organizational climate and patient's safety decrease the overall health care costs. Climate has to be assessed periodically.
Ballangrud et al., 2012	Quantitative study	The patient safety strongly depends on the teamwork, workers commitment and motivation. To improve the patient's safety, the safety climate is needed to include the accident reporting, feedback and communication on the errors and the organizational learning has to provide the system improvement.
Hamdam, 2013	Quantitative study	The patient safety strongly correlates with the teamwork; communication, coordination, and collaboration between the employer and employees. Researcher has found that stressful workplace connects with workers' burnout. Main factor to provide the good safety climate for patients is to support the workers from the side of the management. The actions of the leadership's commitment, the accident reporting and the learning from hazards is substantial.
Eklöf et al., 2014	Qualitative interview study	Supportive leadership, encouraging professional development, resolving conflicts, teamwork and trust in workgroups; supportive environment and climate – all this decreases stressful conditions and strengthens the staff and patient's safety.
Alameddine et al., 2015	Quantitative study	To provide good care, the managers need to change their work culture from a punitive and blaming culture to that of justice and shared responsibility rather than working individually, in which errors are attributed to the deficiencies in the care system.
Sepp et al., 2015	Quantitative study	Management safety priority and ability is the main effective dimension of safety climate that correlates with other dimensions. A good communication, managers' commitment to safety climate, providing blame-free environment and effective safety training to enhance the strong safety climate and safe behaviour among health care workers.

Based on the analysis of the reviewed literature, we found that connections between the positive organizational climate and both, worker and patient outcomes exist (Stone et al., 2008; Eklöf et al., 2014; Flin, 2007). Eklöf et al. (2014) study described a workgroup who had a high score of safety climate and it was followed by the higher degree of safety behaviour and lower accident rates. Flin (2007) showed that low safety climate in health care caused hazards and it had consequences of low safety climate

where workers low motivation caused unsafe behaviour. The same results were found in the research of Nieva & Sorra (2003), who found that if the workers can choose the patients' safety attitude, then it reduces hazards and provides a good safety culture in health care sector.

We found that a very important issue to provide a good care and safety climate, is measuring it qualitatively and quantitatively (Flin et al., 2006). Organization leaders need to understand that assessing and periodically reassessing level of safety climate is very important in providing the good care (Stone et al., 2008; Eklöf et al., 2014; Flin, 2007). In addition to the measurements of a safety climate (culture), there is a big number of hospitals that have been used the Safety Attitude Questionnaire (SAQ). It assesses the substantial variability in teamwork, the safety climate, job satisfaction, stress recognition and working conditions (Sexton et al., 2006). Modak et al. (2007) pointed out that SAQ needs more evaluation, because authors found the links between the inpatient safety attitudes and lengths of stay and nurse turnover rates, but did not find correlations with other safety aspects including evidence to ensure a workers safety behaviour. Kines with colleagues (2011) regrouped health care features to seven safety climate dimensions and developed a Nordic Safety Climate Questionnaire (NOSACQ-50) for using it in the assessment of occupational safety climate in organizations. Kines et al. (2011) postulated seven dimensions to cover previously identified seven elements of safety culture (by Singer et al., 2003) which help to provide a good patient safety (Table 2). NOSACQ-50 was theoretically developed and tested for validity and reliability by Kines et al. (2011). Some researchers (Kines et al., 2011; Lipscomb et al., 2015) have found the NOSACQ-50 to be a reliable tool for assessing safety climate as valid in various sectors and countries for predicting safety motivation, perceived health and safety level and self-rated safety behaviour at work.

Table 2. NOSACQ-50 safety climate dimensions

Seven dimensions (Kines et al., 2011)	Seven elements of safety culture (Singer et al., 2003)
1. Management safety priority, commitment and competence 2. Management safety empowerment 3. Management safety justice	1. Leadership commitment to safety
4. Workers' safety commitment	2.Organizational resources for patient safety
	3. Priority of safety versus production
5. Workers' safety priority and risk non-acceptance	
6. Safety communication, learning, and trust in co-workers' safety competence	4.Effectiveness and openness of communication
	5. Openness about problems and errors
	6. Organizational learning
7. Workers' trust in the efficacy of safety systems	7. Frequency of unsafe acts

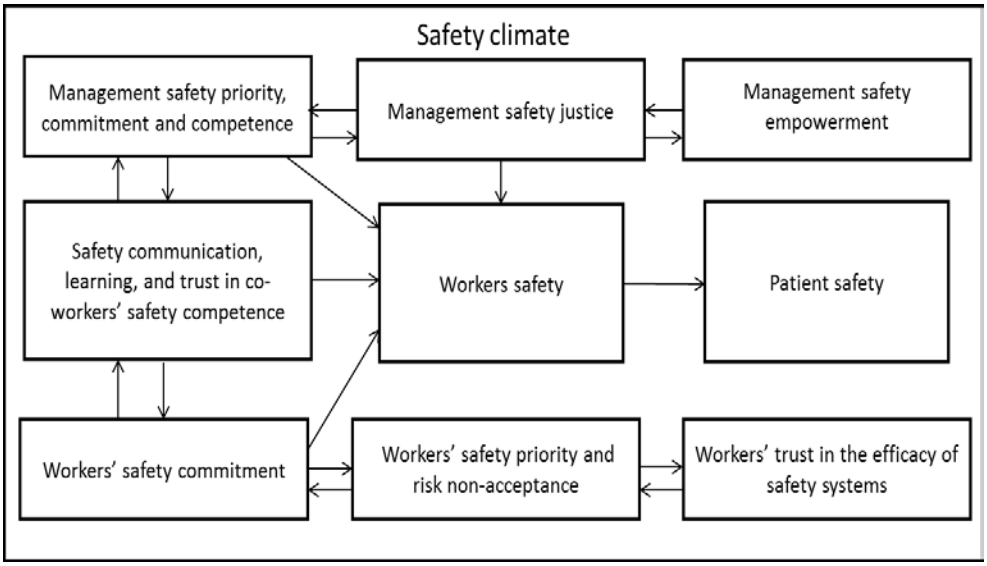

Fig. 1. Safety climate dimensions (Kines et al, 2011) affecting the assurance of patients' and workers' safety

Dimension of the management commitment is the most frequently measured safety climate dimension in health care and in the industry (Flin, 2007). This dimension shows that if managers prioritize safety and are committed to safety; workers' behave safely and they perceive that as a reward (Kines et al., 2011; Ballangrud et al., 2012). Other authors have found that the workers commitment to safety and if safety is among the team goals, a strong team climate should be expected to predict safety (Eklöf et al., 2014).

Management safety justice means that employer procedures and management are fair and promote employee's safety behaviour (Kines et al., 2011). West et al. (2006) point out that if workers feel organizational commitment, then the employees perceived that the managers have treated them fairly. Alameddine et al. (2015) found that a major barrier for improving safety and quality care is a culture of fear in which errors are hidden or under-reported. Ballangrud et al. (2012) found that management safety justice helps to provide a blame free environment and cause a workers trust which help to find the errors and correct them (Lövgren et al., 2002). The management and leadership's commitment (Ballangrud et al., 2012) could be seen as a key element in the promoting the workers safety behaviour and warranting the patient's safety. The teamwork, communication and capacity of organisational learning represent the important place in this system. Manser (2009) found that the teamwork has also significant in the accident prevention, as in teams the workers share

safety-relevant attitudes and the team members behave safely and provide a high- quality care.

Communication and social interaction are the main parts of the organizational existence and organizational climate (Kines et al., 2011). Open and frequent communication between workers and employers is one of the most substantial issue in the organizational safety (Zohar, 1980). To create a fair and non-punitive culture we have to have a strong teamwork (West et al., 2006), foster shared accountability, bolster understanding and management abilities of behavioural choices. In addition, to enhance the system thinking and create a safely working management system, a proactive learning culture with the aim to detect the latent errors has to be developed (Alameddine et al., 2015). Hofmann & Mark (2006) have found that learning from errors is effective if the broadening of the creative space is enabled after the first error. A constructive approach to prevent errors might lead to the changes in the system design and in the creation of the new organizational policies and procedures. Studies show that in the organizations where workers become more educated, they also expect safer working conditions, behave more safety and are more informed about the safe environment (Turner, 1991). West et al. (2006) found that there is a strong correlation between the workers training, learning and commitment.

Results of Eklöf et al. (2014) research indicated that the organizational and psychosocial conditions and processes in the nursing homes are closely related to the psychological working environment. It influenced strongly on the safety in healthcare. They also indicated that professionalism, cooperation and support on the working conditions' level are critically important for creating a good safety. These kind of conditions and processes are well known to be important also for staff health, motivation, learning and innovation (Karasek and Theorell, 1990; Siergist, 2005; Kivimäki et al., 2010). Earlier studies have also shown that the value of good leadership, teamwork and professional autonomy impacts positively on the staff's motivation and employees' commitment to work safely (West et al., 2006). Several authors have shown that to provide a good health care system, good equipment and qualified and motivated staff are needed. Teamwork, management, organizational climate and culture are not enough for staff successful management. It is very important them to know, that for providing a good care we need adequate staff resources and effective human resource management. The quality of workers and managers relationship is strongly related with the staff commitment.

To improve the quality of health care in the nursing homes, the workers who are committed to provide a good care and to create a non-punitive and blame free environment (West et al., 2006; Ballangrud et al., 2012; Alameddine et al., 2015) are needed. The workers are called to speak

freely about accidents (Ballangrud et al., 2012; Hamdam, 2013; Eklöf et al., 2014; Manser, 2009) and to learn from errors (Hofmann & Mark; 2006), mistakes and hazards (Hamdam, 2013). Fig 2. shows the model consisting of the safety climate components which help to provide a good care and ensure the patients' and workers' safety.

Fig 2. Model of the components providing the good health care and ensure the patients' and workers' safety

Conclusion

Health care workers job is very hard and stressful (Sepp et al., 2015). The workers need the continuous support from the leaders and supervisors (Hamdam, 2013; Eklöf et al., 2014). Safety climate includes all components that encourage workers to behave safety and guarantee the patient's safety that helps to provide a good and quality care. The main role there constitutes the measurement of safety climate, it has to be periodical and validated and reliable instruments have to be used. For the health care organizations, the NOSACQ-50 is useful questionnaire. It finds main indicators, which need changes and help managers make decisions basing on the objective results.

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Adsorption Of Heavy Metals Onto Waste Tea

Sukru Aslan, Prof. Dr.
Sayiter Yildiz, Assist. Prof.
Mustafa Ozturk, MSc.
Ayben Polat, MSc.
Cumhuriyet University, Turkey

Abstract

Adsorption of Ni (II) and Cu (II) on the waste tea materials were studied at various temperatures and pHs. The maximum adsorption capacities of tea materials were as determined at the pH and temperature of 5.0 and 50 ^{0}C. Adsorption capacity of tea is more affected from pH than temperature. At the end of the batch experiments, concentration of NH_4-N was lower than 1.0 mg/L. However, COD concentrations were increased from 88 mg/L to 96 mg/L by increasing temperatures from 30 to 50 ^{0}C, respectively. The highest organic matter release from the sorbent was observed at the pH of 2.0.

Keywords: Adsorption, Copper, Nickel, Heavy Metal, Waste tea

Introduction

Adsorption is the process of accumulating pollutants that are in solution on a suitable interface. In this process, a mass in the solution or air is transferred to the solid phase. Adsorption processes are used in drinking water treatment for the removal of taste–and odor causing compounds, synthetic organic chemicals, color–forming organics, and disinfection byproducts precursors (Crittenden et al., 2005). The adsorption process has not been used extensively in wastewater treatment. However, activated carbon treatment of wastewater is usually thought of a polishing process for water (Tchobanoglous et al., 2004).

The discharge of effluents containing heavy metals from a wide range of industries-electroplating, microelectronics, metal forming, paper, textiles, chemicals- is of concern to the public, industry and government alike (Cheung et al., 2000). Various wastewater treatment processes such as chemical precipitation, membrane separation, sorption/ion exchange, solvent extraction, phytoextraction, ultra filtration, reverse osmosis, and adsorption have been used to remove heavy metals from water and wastewater (Cheung

et al., 2000; Kizilkaya et al., 2010). Chemical precipitation and electrochemical methods are become ineffective particularly when metal concentration in the water is too low. Additionally chemical precipitation produces large quantity of chemical sludge (Cojocaru et al., 2009). Some of the conventional methods such as ion exchange and activated carbon adsorption are extremely expensive processes when the wastewater containing trace concentration of heavy metals (Cojocaru et al., 2009; Jianlong et al., 2000; Demirbas, 2008; Kumar et al., 2011) Among the physico-chemical treatment processes, adsorption is found to be highly effective, cheap and easy to adapt (Seco et al., 1997). Although, the most widely studied adsorbent is an activated carbon (Corapcıoglu and Huang, 1987; Seco et al., 1997), the application of waste materials for the removal of heavy metal from water has been much attention in last decades. When compared to activated carbon, the usage of waste materials as a low-cost adsorbent such as fish bones (Kizilkaya et al., 2010), cashew nut shell (Kumar et al., 2011), rice straw (Rocha et al., 2009), untreated coffee grounds (Azouaou et al., 2010), organisms (Aslan and Topcu, 2015; Ozdemir et al., 2003; Pagnanelli et al., 2009), egg shell (Aslan et al., 2015; Polat and Aslan, 2014), black carrot residues (Guzel et al., 2008) has been received considerable attention to remove heavy metal ions from water and wastewaters by researchers.

In this experimental study, Cu(II) and Ni(II) adsorption capacity of the waste tea materials under various pHs and temperatures were investigated. Additionally, releases of organics and NH_4-N from the waste tea under different conditions were determined.

Materials and Methods

Biosorbent Preparation

The waste tea materials was used for the adsorption of Cu(II) and Ni(II) from synthetic wastewater. After washing the waste tea with tap and pure waters, it was dried at about 105 ^{0}C in an oven. After adding tea in the water volume of 100 mL, the initial pH of water solution was adjusted to target values using H_2SO_4 and NaOH solutions. The final pHs of the samples were determined after completing the batch experiments.

Adsorption Studies

The stock solutions of Cu(II) and Ni(II), which were prepared using analytical grade of $NiCl_2.6H_2O$ and $CuCl_2$ in demineralized water, was used throughout the experiments. The waste tea of 0.1 g was added into 100 mL demineralized water. Batch experiments were carried in 250 mL glass-stoppered Erlenmeyer flasks. The adsorption uptake of the waste tea under the initial Cu(II) and Ni (II) concentration of 25 mg/L, agitation rate of 150

rpm was investigated. The maximum adsorption capacity was determined at the pH values varying between 2.0 and 5.0±0.1, shaking the suspension for 2 hours at a temperature of 40±1 ^{0}C. The mixtures were stirred at the temperatures of 30, 40, and 50±1 ^{0}C at the pH value of 5.0. The aliquots of supernatant were withdrawn and centrifuged at 4000 rpm for 10 min (NF800, NUVE) for Ni(II) and Cu(II) analysis. Heavy metal concentrations were determined by using spectraquant analytical kits (Merck, 14785 and 14767) by a Merck photometer (PHARO100). The initial and final concentrations of COD were determined according to standard methods (APHA, 1995).

The equilibrium adsorption capacity and removal efficiency of the waste tea were determined by the Equation I and II, respectively.

$$q_e = \frac{(C_0 - C_e) \times V}{m} \quad (1)$$

$$(E)(\%) = 100 \times (C_0 - C_e) / C_0 \quad (2)$$

Where q_e is the sorption capacity, E is the removal efficiency, C_o and C_e are the initial and final concentrations of heavy metals in the solution, V(L) is the volume of solution and m (g) is the waste tea amount.

Results and Discussion

The equilibrium time was determined in 45 minutes for Cu(II) and Ni(II) at the agitation velocity of 150 rpm.

Effects of pH

As pH in metal-containing wastewater can vary, experimental study at different pH values were tested to determine the effect of Cu(II) and Ni (II) sorption by waste tea materials. Water pH governs the speciation of metals and also the dissociation of active functional sites on the sorbent (Azouaou et al., 2010). The extractability of the heavy metals from water is pH dependent. In this study, initial pHs of water were adjusted to the value of 2.0, 3.0, and 5.0±0.1. The effectiveness of the process is defined by the quantity adsorbed (mg/g) versus pH plot for Cu(II) and Ni(II) involved, as presented in Figure 1. The maximum adsorption capacity was determined at the pH value of 5.0 for Cu(II) and Ni (II). The sorption capacity of waste tea were 6.3 mg Cu(II)/ g sorbent and 8.8 mg Ni(II)/g sorbent at the pH 2.0. Increasing the initial pH of the solution from 2.0 to 5.0, q_e values reached to about 14.9 mg Cu(II)/g sorbent and 10.8 mg Ni(II)/g sorbent. At lower pH, the surface of the sorbents exhibits an increasing positive characteristic. H+ ions present at a higher concentration in the solution and compete with Cu(II) and Ni(II) ions for the active sites of sorbent resulting in the decreased uptake of heavy metal (Nuhoglu and Oguz, 2003). Significant pH variations

between initial and final solutions were not observed throughout the experimental studies.

At lower pH, H^+ ions compete with metal cation for the exchange sites of the sorbents, thereby partially releasing the latter. The heavy metal cations are completely released under circumstances of extreme acidic conditions (Nuhoglu and Oguz, 2003).

Removal efficiencies of Cu(II) and Ni(II) were increased from about 25% to 60 % and from 35% to 43% by increasing pH from 2.0 to 5.0, respectively. As can be seen in Figure 2, releases of organic matters and ammonium from the waste tea are increasing with decreasing pH.

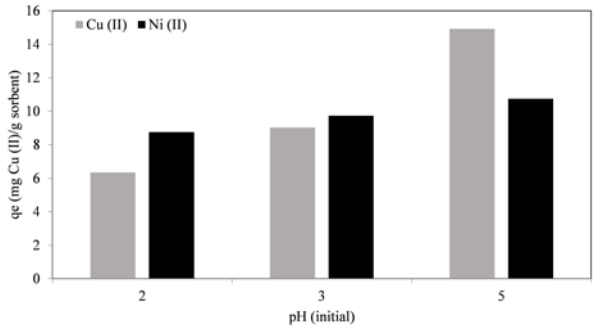

Figure 1. Effects of pH on the sorption capacity of waste tea (Temperature = 40^0C).

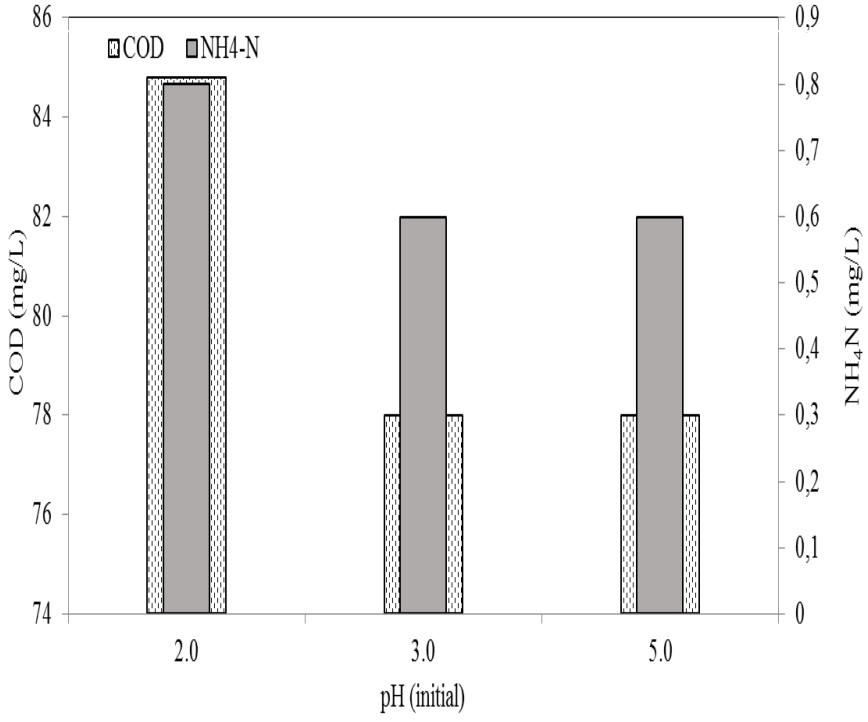

Figure 2. Variations of COD and NH_4-N concentrations under different pHs (Temperature = 40^0C).

Effects of Temperature

The variations of q_e value at various temperatures under the adsorbent dosage of 1.0 g/L, initial Cu(II) and Ni(II) concentration of 25 mg/L, agitation speed of 150 rpm and initial pH of 5.0±0.1 are presented in Figure 3. Figure is revealing that the adsorption capacity of waste material at equilibrium slightly increased with increasing temperature from 30 ^{0}C to 50 ^{0}C. The values of q_e increased from 8.7 mg Ni(II)/g and 11.5 mg Cu(II)/g at 30 ^{0}C to 10.9 mg Ni(II)/g and 14.7 mg Cu(II)/g at 50 ^{0}C. After completing batch experiments, COD and NH_4-N were detected in the waters. Although the concentrations of NH_4-N was lower than 1.0 mg/L, COD concentrations increased from 88 mg/L to 96 mg/L by elevating the temperatures from 30 to 50 ^{0}C, respectively (Figure 4). Similar observation was observed by other studies and results attributed to the creation of some new active sites on the sorbents and increase in collision frequency between adsorbent and cations at high temperatures (Polat et al., 2014).

The highest removal efficiency of Cu(II) (59%) and Ni(II) (43%) were observed at the temperature of 50^{0}C.

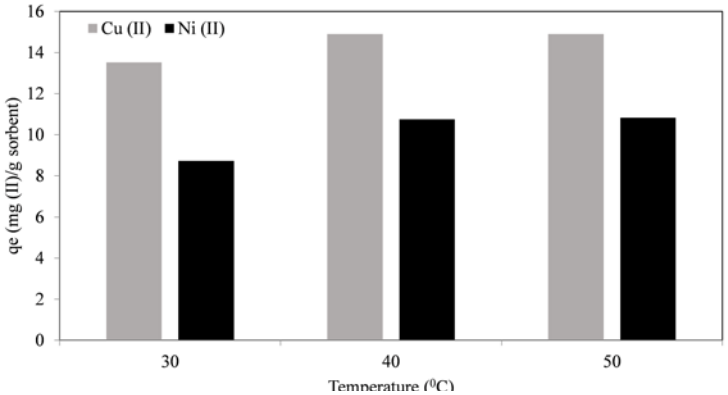

Figure 3. Effect of temperatures on the sorption capacity of waste tea.

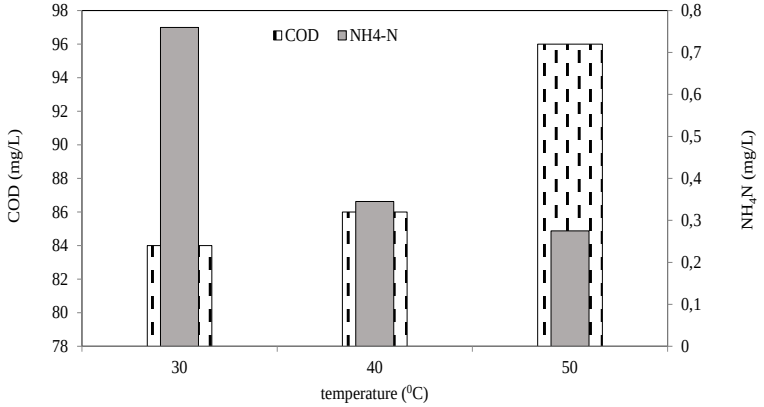

Figure 4. Variations of COD and NH_4-N concentrations at various temperatures (initial pH= 5.0).

Conclusion

The highest adsorption capacity for Cu (II) (14.9 mg/g) and Ni (II) (10.8 mg/g) at pH 5.0 were observed. Adsorption of Cu(II) and Ni(II) was not significantly affected from the temperature under experimental conditions. Significant concentration of organic matter was released from the waste materials. With a low-cost waste tea material, the adsorption process is a very useful method for removal of heavy metals from the wastewater.

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Sorption Of Heavy Metals On Biosludge

Sukru Aslan, Prof. Dr.
Mustafa Ozturk, MSc.
Sayiter Yildiz, Assist. Prof.
Cumhuriyet University, Turkey

Abstract

Biosorption of Ni (II) and Cu (II) on the dead cell, which was obtained from the municipal wastewater treatment plant, was studied at various temperatures and pHs. It was found that the heavy metal sorption on the microorganisms was a function of initial solution pH. The lowest q_e values were observed at the pH value of 2.0. However, Increasing the pH value of 5.0, sorption capacities increased significantly. The sorption capacity of dead cell was not significantly changed with temperatures. Release of organic materials and ammonium from the cell was also determined in the solution.

Keywords: Biosorption, Copper, Nickel, Waste Sludge

Introduction

The conventional treatment methods which are used to remove heavy metals from aqueous solutions are chemical precipitations, filtration, ion exchange, evaporation, reverse osmosis, solvent extraction, electrochemical and membrane technologies. However, these methods are either inefficient or expensive when heavy metals exist in trace amounts. Consequently it is important to find new methods for removing heavy metals from water and wastewaters (Kumar et al., 2011). Heavy metals are non-biodegradable and tend to accumulate in aquatic organisms and transfer to consumers, including humans, leading to various health problems (Celekli and Bozkurt, 2011; Nuhoglu and Oguz, 2003; Kumar et al., 2011). Copper and nickel are toxic to aquatic organisms even at low concentrations in natural water.

Biosorption of heavy metals by dead cell has been much attention in recent years (Aksu and Donmez, 2001; Cojocaru et al., 2009; Gupta et al., 2006; Kapoor and Viraraghavan, 1997; Lokeshwari and Joshi, 2009; Nguema, et al., 2014; Pagnanelli et al., 2009; Rao and Bhagavi, 2013). Bacterial cell walls contain acidic functional groups and can bind significant amounts of cationic pollutants include heavy metals (Ginn and Fein, 2008).

This experimental study is focused on Cu(II) and Ni(II) removal from aqueous solutions using dried non-living waste sludge as biosorbents. Experiments were carried out at various pHs and temperatures. Especially, Cu (II) and Ni (II) sorption capacities and organics and NH_4-N release from the dead cell under different conditions were determined.

Materials and Methods

Biosorbent Preparation

Activated sludge biomass was used for the adsorption of Cu(II) and Ni(II) from synthetic wastewater. After being drawn from the settling tank of Sivas Wastewater Treatment Plant (WWTP), the activated sludge was repeatedly washed with tap and pure waters to remove impurities and dried at about 60 ^{0}C. The dried and dead biomass which was 0.1 g was added to the water solution of 100 mL. The pH of water solution was adjusted to target values using H_2SO_4 and NaOH solutions. The final pHs of the samples were measured after completing the experiments.

Sorption Experiments

The stock solutions of Cu(II) and Ni(II) were prepared at the concentration of 1000 mg/L using analytical grade of $NiCl_2.6H_2O$ and $CuCl_2$ in demineralized water. These stock solutions were used for the preparation of test solutions by dilution. The dried biomass was added to the solution (1.0 g/L) and the suspension was maintained under agitation (at the velocity of 150 rpm) on an orbital incubator shaker (Gerhardt) for 2 hours. Samples were collected and centrifuged at 4000 rpm for 10 min (NF800, NUVE). Concentrations of Ni(II) and Cu(II) in the solutions were determined by using a Merck photometer (PHARO100). Spectraquant analytical kits (Merck, 14785 and 14767) were used to measure Cu(II) and Ni(II) concentrations in the initial and final solutions. COD concentrations of the influent and effluent samples were determined according to standard methods (APHA, 1995). Concentrations of NH_4-N in the clear sample was determined with Merck photometer (PHARO 100) using analytical kits; NH_4-N (14752). The analysis of samples was carried out at the ambient temperature.

The equilibrium adsorption capacity of the organisms was determined by the Equation I.

$$q_e = \frac{(C_0 - C_e) \times V}{m} \quad (1)$$

Where q_e is the sorption capacity, E is the removal efficiency, C_o and C_e are the initial and final concentrations of heavy metals in the solution, V(L) is the volume of solution and m (g) is the sorbent amount.

Results and Discussion

Effects of pH

Since the value of pH effect the heavy metal speciation in the solution, the acidity of solution is an important parameter for the sorption of heavy metals from aqueous solutions (Chojnacka et al., 2005). The sorption of Ni(II) and Cu(II) were investigated as the function of pH value of 2.0, 3.0 and 5.0.

Significant variation between initial and final pH values were not observed during the study. The sorption capacity of dead cell is presented in Figure 1. As can be seen from the figure that, heavy metal sorption on the microorganisms was a function of initial solution pH. The lowest q_e value of 4.2 mg Cu(II)/ g sorbent and 3.3 mg Ni(II)/ g sorbent were observed at the pH value of 2.0. Increasing the pH value of 5.0, sorption capacities increased significantly to 18.6 g Cu(II)/g and 11.5 mg Ni (II)/g sorbent. It was assumed that the ionization degree of Cu(II) and Ni(II) and the surface property of the dead cell might be affected by the pH and q_e values for the studied metals were increased.

The dead cell contains organic matters and nitrogen. After adding the cell into the solution, organic matter and nitrogen are release from the cell compounds (Aslan and Topcu, 2015). Organic contents and NH_4-N concentrations in the water at various pHs are presented in Figure 2. The highest concentration of 158 mg COD /L was determined at a pH of 2.0. However, average ammonium-nitrogen concentration of 2.5 mg/L was measured throughout the experimental studies.

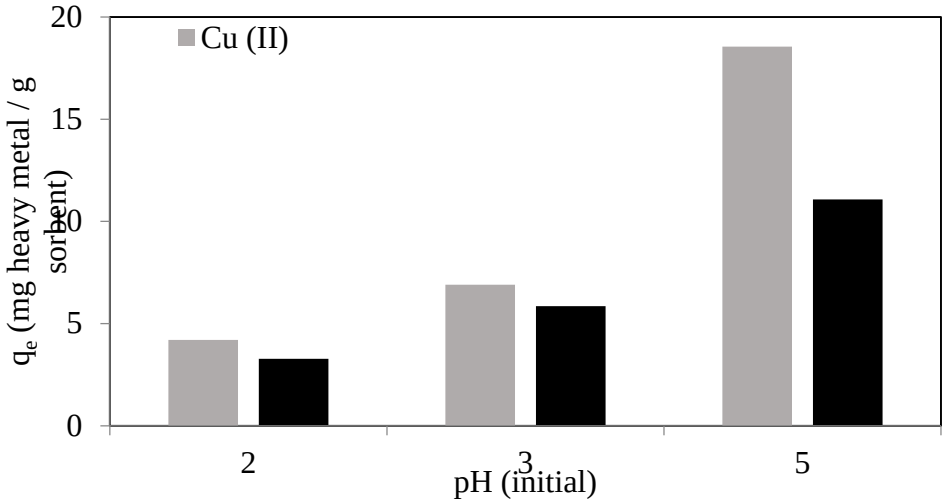

Figure 1. Effects of pH on the sorption capacities (Temperature = 40^0C)

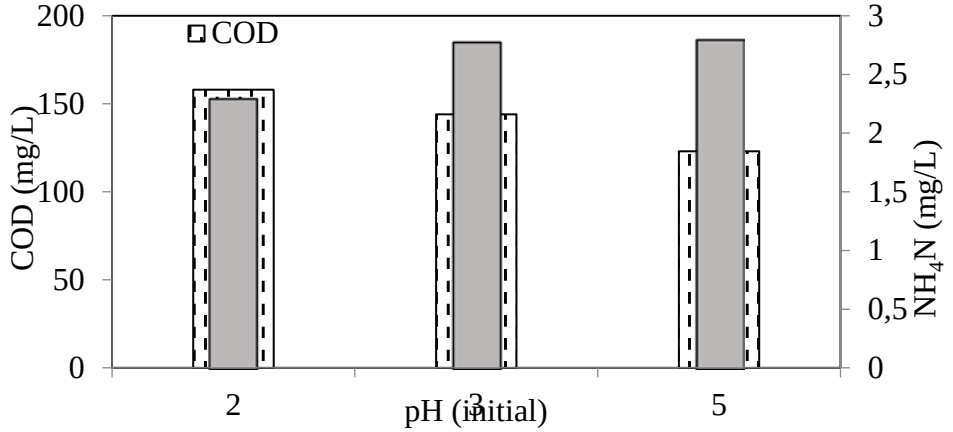

Figure 2. Variations of COD and NH_4-N concentrations under different temperature (Temperature = 40^0C).

Effects of Temperature

The sorption capacity of dead microorganisms was not significantly changed with temperatures. Average sorption capacities were 18.4 mg Cu(II)/g sorbent and 10.4 mg Ni (II)/ g sorbent were observed at a temperature of 30 ^{0}C. It was increased to about 18.9 mg Cu(II)/g sorbent and 11.0 mg Ni(II)/ g sorbent at a temperature of 50 ^{o}C (Figure 3). It was assumed that the cell components are released easily by the dead cell into the solution under low temperature conditions. The concentrations of COD and NH_4-N in the water are depicted in Figure 4. Elevating the temperatures from 30 to 50 ^{0}C, the release of organic contents into the aqueous solution increased from about 70.4 to 92 mg COD/L. However, NH_4-N concentrations in the solution were just increaed from 2.1 to 3.0 mg NH_4-N/L by increasing the temperature from 30 ^{0}C to 50 ^{0}C, respectively.

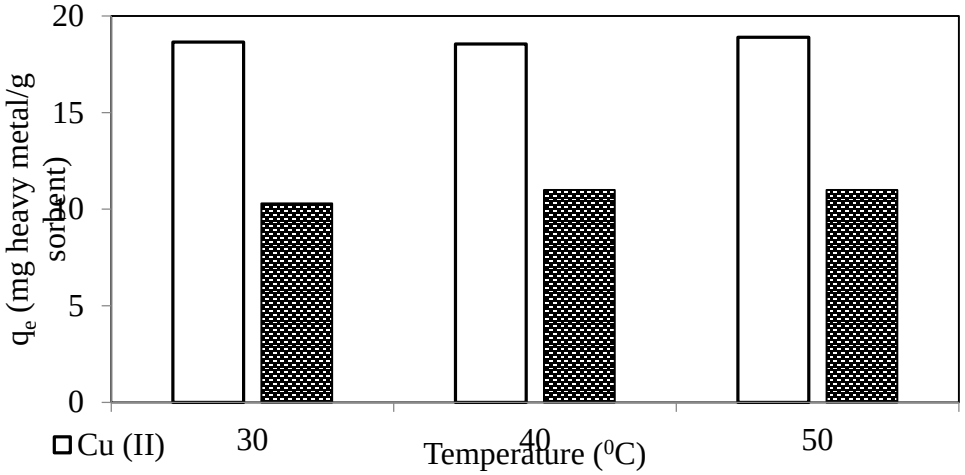

Figure 3. Temperature effect on the sorption capacity of dead cell.

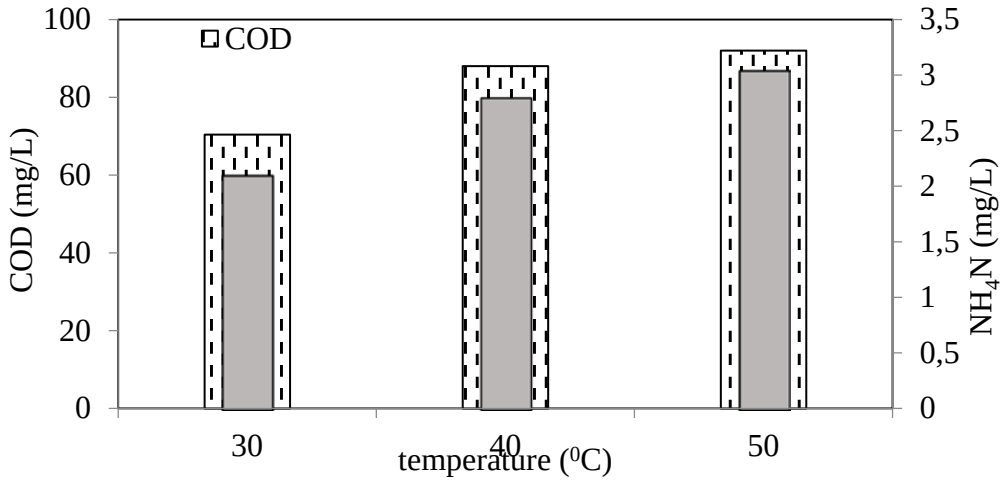

Figure 4. COD and NH_4-N concentrations variation under different tempeartures (initial pH= 5.0).

Conclusion

In this experimental study, the possibility of use of dead cell which was obtained from WWTP to remove Cu (II) and Ni (II) ions from aqueous solution was investigated. Experimental results indicating that the dead cell could be applied to remove heavy metal from aqueous solution. The highest q_e value was obtained at the pH value of 5.0. Biosorption of Cu(II) and Ni(II) was not temperature dependent. It was found that the cell components were easily released from the biosolid at the studied temperatures.

Acknowledgment

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Investigation Of Aerobic Degradation Of Industrial Wastewater Containing High Organic Matter: Kinetic Study

M. Sarioglu Cebeci, Prof.
I. Senturk, PhD
U. Guvenin, Bsc
University of Cumhuriyet/Environmental Engineering Department, Turkey

Abstract

Aerobic biodegradability of the industrial wastewater (IW) containing high level of COD was assessed in laboratory-scale batch reactors. Two experimental runs were carried out at a ratio of substrate-to-microorganisms concentration S_o/X_o equal to 0,5 and 3,5 g COD /g MLVSS while equal to 1 ratio of synthetic wastewater to IW. Chemical oxygen demand, pH, and alkalinity were determined during the experiments. An increase in the influent substrate concentration not caused a decrease in COD removals at similar times of working. Since the inoculum was previously acclimatized to COD concentration, a substrate (mixture of the synthetic and industrial wastewater) inhibition at the higher concentrations of COD most probably was absent. It was found that a first-order kinetics adequately described the variation of COD removal with time. The values of the first-order reaction constants were found to be 0,3083 and 0,2038 d^{-1} for Runs 1–2, respectively.

Keywords: Industrial wastewater, activated sludge, aerobic treatment, COD removal, first-order kinetic model

Introduction

Some industrial wastewaters have complex mixtures. Such mixtures render of wastewaters potentially toxic to the environment. One solution to the disposal problem is on-site biological treatment of such wastewaters, using bioreactor systems.

Hardly any attempts have been undertaken to imply biological methods to industrial wastewater treatment without prior physical-chemical splitting. Biological treatment offers an alternative solution. Aerobic biological treatment processes can successfully degrade simpler and more

bioavailable constituents of this type complex wastewater, leaving behind complex recalcitrant, and potentially toxic organic compounds. These toxic components of the waste typically persist after biological treatments and thus have to be further treated in order to enable safe disposal, which can add additional costs.

The study was assessment treatability of an industrial wastewater contain high organic matter (mixture of biodegradable substance and small amount of non-biodegradable substance). The aim of this research was to develop a biotechnological method for industrial wastewaters containing high organic matter. Especially this level COD contain industrial wastewaters such as textile dye industry, meat processing industry, cheese whey, milk industry, pulp and paper industry, oily wastewater producing industries etc.

For example; olive mill wastewaters (OMW) has a high pollution power with biological oxygen demand (BOD) values in the range of 89–100 g/l and chemical oxygen demand (COD) values in the range of 80–200 g/l. These values are around 200–400 times higher than those of a typical municipal sewage (Fadil et al., 2003).

Treatment of textile dye industry wastewater is highly complex due to the presence of color, toxicity, BOD, COD, turbidity, TDS, TSS, etc. Physical and/or chemical processes are employed for the treatment of dye wastewater. But these processes have some drawbacks. Alternatively, biological processes have received great attention in recent years for its efficiency and inexpensive. Microorganisms like bacteria, fungi and yeast are widely used for the decolorization of dye wastewater (Sathian et al., 2014).

Materials and methods

Characteristics of the inoculum used in the experiments

The inoculum was activated sludge biomass coming from municipal wastewater treatment plant. The experimental work for prepare of inoculum was carried out on bench scale SBRs made of Plexiglas vessel with a working volume of 3 litres and ports for effluent and sludge wastage. Air was provided using a glass diffuser, connected to an air pump. Feed addition and sludge wasting were achieved using peristaltic pumps. Digital timers connected to the reactors were used to automatically control reaction times, aeration and mixing. Agitation speed was 1,1 rpm. The diagram of the bench scale SBR system is depicted in Fig. 1. The cycle time of the reactors was kept constant at 14 h per day as shown in Fig. 2. Sludge was wasted at the end of the aerobic period and the effluent was withdrawn at the end of the settling period. The SBRs were fed with synthetic wastewater with the following composition (Table 1).

The SRT was 10 days and the operating F/M range was 0.342 and 0.786 mg COD / mg MLVSS day for R1 and R2, respectively. The reactor was operated at room temperature. The activated sludge obtained after this aeration process was used as inoculum in the experiments.

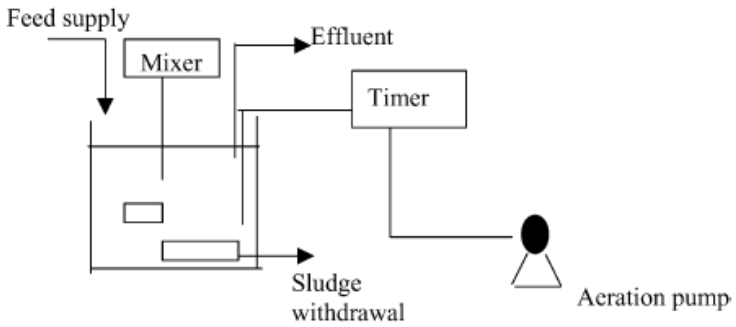

Fig. 1: Schematic diagram of the SBR used in this study (Sarioglu, 2005).

Feed	Aerobic		Settle
Mixing and influent pump	Mixing and aeration	Mixing only	No mixing, no aeration
Operating time (hours)			
4 hours	8 hours	1 hour	1 hour

Fig. 2: Operating stages of the 14 h SBR cycle.

Table 1: Synthetic influent composition (COD = 3000 mg/l, pH buffer 8.2) (Van den Broeck et al., 2009).

Component	Concentration (g/l)
$C_6H_{12}O_6$ (glucose)	2,550
NaCl	0,075
$CaCl_2.2H_2O$	0,075
$MgSO_4.7H_2O$	0,075
$FeCl_3$	0,015
$(NH_4)_2HPO_4$	0,583
K_2HPO_4	1,875

Batch experiments and experimental procedures

Original wastewater samples (IW) used as substrate were obtained from metal production plant. As IW does not contain microorganisms capable of aerobic degradation, a previous stage was necessary to acclimatize bacterial flora from activated sludge to this substrate. For this purpose, the reactor was inoculated with an activated sludge taken from a municipal wastewater treatment plant.

The batch aerobic experiments were carried out in 250 ml glass erlenmayer flasks with a working volume of 150 ml. Each of the flasks consisted of aerobic mixed culture to provide a sludge concentration of 3000 mg MLVSS / l. Two experimental runs were carried out in batch mode using

different initial substrate concentrations (3680 and 9000 mg COD / l in Runs 1–2, respectively) at the ratio of the initial substrate concentration to the initial biomass concentration So/Xo equal to 0,5 and 3,5 g COD / g MLVSS while equal to 1 ratio of synthetic wastewater to IW, respectively. Table 2 shows the operating conditions of the two runs (R1 and R2) performed during the experiments. A temperature controlled incubator was used at 35^{o}C for all experiments. The flasks were shaken at 150 rpm. Each experimental run was carried out in duplicate and the final results considered were the average values obtained.

Analytical methods

COD, pH, MLVSS, and bicarbonate alkalinity were measured according to standard methods. The COD concentrations were determined with closed reflux titrimetric method (APHA, 2005). The samples were centrifuged at 4000 rpm for 30 min before determining the concentrations of COD. 0.45 μm membrane filters were used to determine MLVSS concentration.

Table 2: Experimental conditions of aerobic batch study.

Stock		Volume (ml)	Resulting concentrations
Sludge	8790 mg MLVSS/l (R1) 13360 mg MLVSS/l (R2)	51,2 33	3000 mg MLVSS/l
Glucose (synthetic wastewater)	3000 mg COD/l (R1) 10500 mg COD/l (R2)	37,5 75	Desired composition
$NaHCO_3$	50 g/l (R1-R2)	15	5000 mg/l
IW	76000 mg COD/l (R1) 76000 mg COD/l (R2)	1,48 10,36	Desired composition
Total volume		150 ml (R1-R2)	

Results and discussion

Variation of the parameters evaluated as a function of time

Figs. 3-6 show the profiles of substrate concentration as COD, pH, and alkalinity in Runs 1-2, respectively. An increase in the initial substrate concentration not caused a decrease in the percentages of COD removals. Alkalinity and pH values increased with the aeration time in all experimental runs.

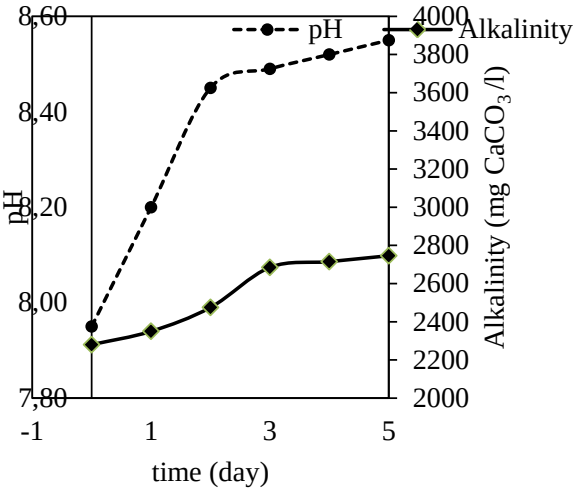

Fig. 3: Variation of pH and alkalinity during the operation time (R1)

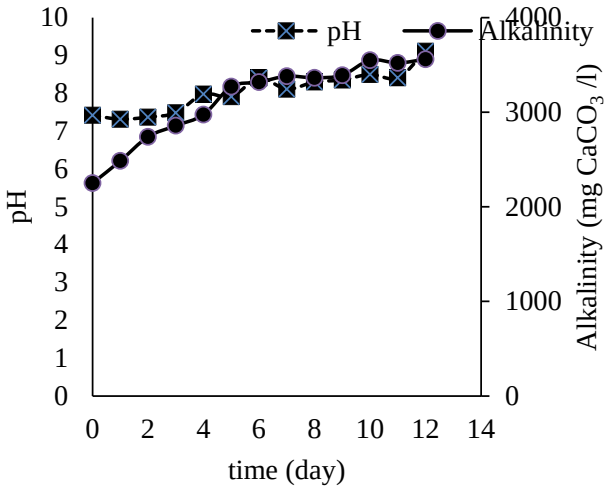

Fig. 4: Variation of pH and alkalinity during the operation time (R2)

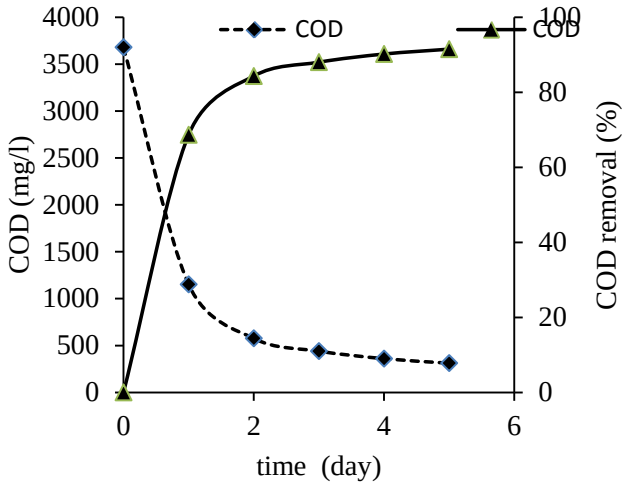

Fig. 5: COD removal using mixed culture during the operation time (R1)

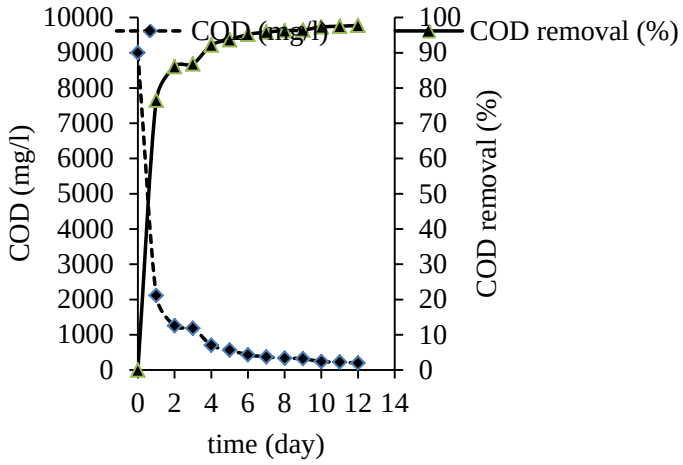

Fig. 6: COD removal using mixed culture during the operation time (R2)

The results of COD samples of the present study indicate removal efficiencies of 91,52% for 5h reaction time for R1, and 93,7% for 5h reaction time while 98% for 12h reaction time for R2.

Kinetics of organic matter removal

Based on experimental data, kinetic constants of substrate degradation were determined by using Eq. (1). A first order kinetic expression was often used to describe the biodegradation process (Durai et al., 2011).

$$dC/d_t = -k\,C \qquad (1)$$

where C is the substrate concentration (mg COD/L), t is the degradation time (min) and k is the biodegradation rate constant. First-order kinetic model was used to determine kinetic constants of COD degradation as shown in Figs. 7-8. Ln ($S_i/S_{o)}$ versus time were plotted to find out the kinetic data.

Figs 5-6 show the variation of COD versus the experimental time. The organic matter concentration decreased with time, following a logarithmic pattern, which is considered a classic first-order kinetic. The obtained values of R^2 confirmed that the first-order kinetic model was suitable to describe the degradation of organic matter in the reactor. In a first-order kinetic model, the substrate concentration at any aeration time may be expressed as follows Eq. (2) (Sa´nchez et al., 2007).

$$S= S_o [Exp – k_1\theta] \quad (2)$$

Figs. 7 and 8 show these plots for Run 1 and 2, respectively. A group of straight lines whose slopes were equivalent to k. Regression coefficients (R^2) were 0,894 and 0,944; values of the slopes obtained were 0,3083 and 0,2038 d^{-1} for Run 1 and 2, respectively. The low value of k obtained for the highest initial substrate concentration (Runs 1 and 2). The comparison of the experimental data and the theoretical ones obtained by Eq. (1) gave differences lower than 5 % in both cases.

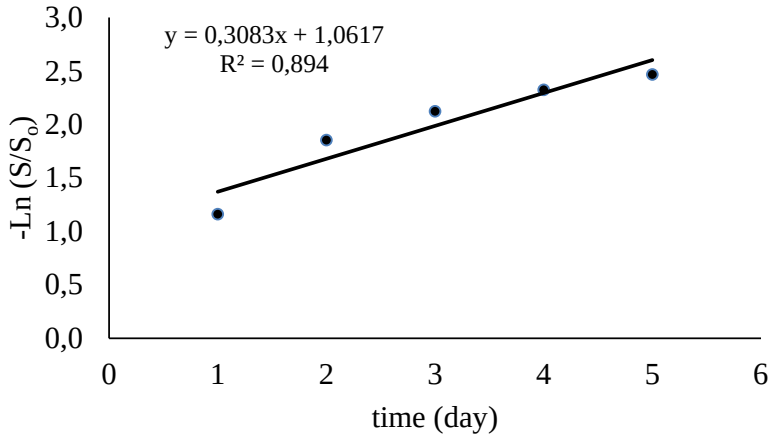

Fig. 7: Determination of the first-order kinetic constant for Run 1

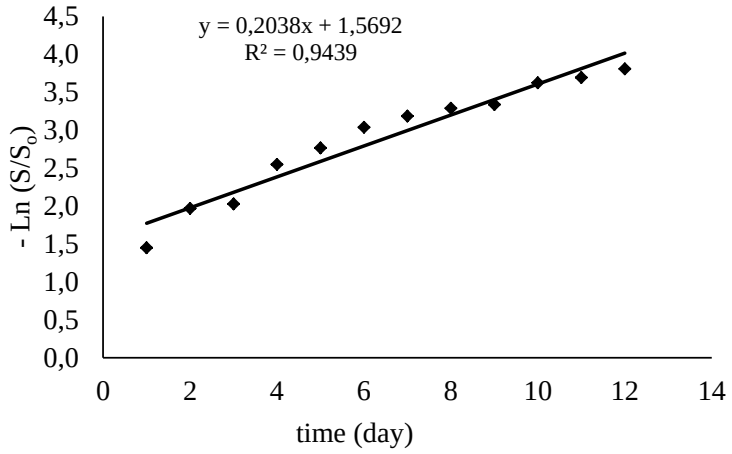

Fig. 8: Determination of the first-order kinetic constant for Run 2

Conclusion

The results of this study demonstrate that industrial wastewaters containing COD are biodegradable aerobically in batch mode. An increase in the initial substrate concentration not caused a decrease in COD removals at similar reaction times. Maximum COD removals of 91,52 % and 93,7 % were achieved after 5 day of reaction time for an influent substrate (COD) concentration of 3680 and 9000 mg l^{-1} (Runs 1 and 2).

The kinetic study was carried out using a first order based model and the degradation follows the first order system.

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Involvement of Students in Experimental In-store Research Projects

Beata Pethő, PhD student
University of Pannonia / Hungary

Abstract

In the field of business education, the issue of how many practical skills we can teach students and in what way we can do this has been an ongoing problem. In our modern world, it is essential for students to adopt a 'learning by doing' attitude as early as their undergraduate years and enter the labour market having useful insights into business. It is of particular significance for students in business sectors to understand the practical considerations of methodology, as a result, they should be involved in the research practices of the branch of science they have chosen to study. The aim of this research, besides supporting the practice of business education, is to explore how to describe consumer behaviour in in-store situations. Therefore, this paper is composed of two parts: one of them describes the background and methods of the research project, while the other presents an applied business education case.

Keywords: Business education, consumer behaviour, field study, practice in research

Introduction

As R. Casidy says, universities and business schools "should strive to engage in market-oriented activities to remain competitive in the increasingly competitive education environment. (2014, p.162.)" In the field of business education, a number of institutions at the moment fail to provide students with adequate practical experience that is indispensable for obtaining useful practical knowledge. The labour market, however, demands practice-oriented students who, if faced with a real problem at their workplace, have the right knowledge to start seeking solutions. The only way for them to obtain a firm basis is to internalise what has been taught to them in theory through experience. It is very important as early as their undergraduate years that education management organisations should pay special attention to use a 'learning by doing' approach to education. The introduction of dual education is a practice-oriented methodological

experiment in the higher education development programme started in Hungary. The aim is to increase the number of training programmes that provide useful and valuable professional practice opportunities. The training programmes enable students to spend 3 months a year at a cooperating company, where they can be involved in the activities of the firm and have the chance to gain the soft skills such enterprises require.

Within the scope of subjects taught, teachers are in many cases guided towards the 'easy solution' and education is carried out primarily through an in-depth analysis of theory, let alone the fact that this is considered to be a less costly solution. Thus, during the time available for practice, students face real-life issues only in case studies, despite the fact that engagement in practice ensures a much greater motivation for understanding.

As L.Vos posits,…"considerable research findings have demonstrated the value of simulations in motivating and engaging students and in developing their skills and competencies. (2015, p.57.)" It is important to emphasize that a pool of teachers having the required competencies and experience should be maintained in higher education. Several authors have touched upon this issue in their writings. In connection with the situation in Hungary, I would like to highlight the article titled 'About Limits to Globalised Teaching Methodologies'. (Z. Veres, L. Józsa,2005.) The authors claim that, ..."one of the major obstacles of practice-oriented teaching is that it requires teachers with practical experience." Institutions should be aware of the demands of the labour market and develop practical plans, in addition to using an efficient assessment system, that oriented to the practice and concerns professional contexts.(Brown, 2004. p. 83-84.)

Example of practice-oriented subject management

In consideration of the needs of the labour market, we, at the Marketing Institute of the University of Pannonia, show a preference for using experimental research to teach the professionals of the future on the basis of a 'learning by doing' approach. This is especially important in the field of marketing, for this is where multidimensional issues occur with great frequency, therefore, one can be efficient in this profession only if we provide students with a chance to gain an insight into real processes. A marketing expert must know what is in the consumers' heads, what influences their shopping behaviour and what motivates them to have preferences. Within the scope of the Scientific Research Programme[4] started

4 Acknowledgement: The research is supported by Hungarian Scientific Research Fund (No. OTKA K116040) of National Research, Development and Innovation Office

at the Marketing Institute, we test the research modules with the involvement of students. Students join the Programme through their marketing seminars. The research program was centred on a multi-step in-store research carried out in a real shopping environment. The data collection phase was completed together with our students. Thus, the students, as subjects to the research, could make themselves familiar with the research process on the basis of their experiences. By teaching students on the basis of their own experience, they can have a better understanding, comprehension and acquisition of what has been taught in theory.

The research design was developed by the teachers of the Marketing Institute of the University of Pannonia. The aim of the research is to study the development of consumer preferences before, after and during the shopping process. We want to observe how consumers' choice decisions are related to their interactions and how in-store stimuli effects can influence the purchasing decision. It is a well-known fact that the shopping environment can have a significant impact on consumer decisions. Higher number of shoppers re influenced by instore conditions, the installing is chock-full with marketing and POS materials. (McGoldrick, Betts, and Keeling 1999). According to Foxall and Goldsmith the physical environment motivate the curiosity of the buyers. These can be extra displays, price tags, sale signage and specific messages etc…that "all likely to directly affect consumer behaviour (1994.)"

They had preliminary information on the research projects during their lessons. The data collection phase of the research was completed within the scope of seminars. As a result, the students could try the research methods learnt at theoretical lectures themselves.

The design is complex and consists of various research methods, such as pre-tested questionnaire surveys, eye-tracking surveys and a post-experiment qualitative research. In order to get a deeper understanding of in-store choice decisions, the research focus is on buyers interactions in the store. "In-store gaze behaviour is of key importance in situational buying intention. (Wästlund et al. 2015.)" Data collection was implemented in three stages in 2015. We explored buyers' explicit preferences of four types of products (soft drinks, beers, sweets and milk products) in an online questionnaire survey among students. We asked them what their main preferences were in the given 4 product segments and how they ranked them. The second stage was an in-store experiment in a specific retail food store (see Figure 1). Before starting their shopping tour, they had to put on an 'eye camera'. Thus they had the chance to examine the operating mechanism of the camera as well as the images taken and could also take part in the calibration process. The camera followed the customers' shopping trip and observed customer behaviour: when, what and how long they were looking

at (Figure 2.) and what the influential factors were. They had to choose one product from each category according to their normal buying habits. We investigated the preferences in the store and how customers use in-store signs to navigate and make decisions. The survey lasted for three days. Regarding eye-tracking, we estimated an average of 20 usable trackings a day. After the in-store eye-tracking survey, we conducted an interview among the students (third stage of the research), where we asked them about their buying decisions with respect to the four types of products. During the survey, we tried to study individual behaviours by identifying students and their answers. The object of the study is not to identify general statements but to set up a classification of behaviours. The above review suggests that there are some unknown territories yet to be discovered. The research examined primarily the cognitive and perceptual elements of buying decisions, as a consequence, the exploration of the emotional dimension of consumer behaviour is limited.

Conclusion

Regarding the application of the results of this research in education, by investing 4 days of class time, we have managed to present the students with several research methodologies efficiently used in the profession. The engagement of students provides them with useful practical experience and is advantageous in terms of research costs, since the recruitment of participants involved in the research means further costs in general. In addition, we can make observations on the consumption behaviour of the target group of students, which can provide useful research output in the segment concerned. One of the drawbacks is that its validity is limited, since the target group is greatly restricted. The entire sample is limited to a specified age group and education level, as a consequence, it is not representative of other consumers with different demographic characteristics. The fact that the students take part in the training programme and study the methodologies used leads to further distortion of the results because there is a chance that they do not behave as ordinary consumers. Another problem may arise if they consider practice as an obligation and want to complete it as quickly as possible, as a result, they do not show their real preferences in the shopping situation. As a summary of the education-related experience of the research: on the basis of feedback received from the students, we can say that they found this opportunity positive and useful. It was a great motivation for their preparations, for they could have their own real-life experience of something they had discussed ‘only’ in theory. Based on our current experience, the involvement of students in the data processing phase, in addition to the implementation of the research, may provide further opportunities in the future. In this respect, they could also have a chance to interpret research

results. This is an extremely important consideration for efficient professional training because when they enter the labour market and have similar problems in real life, they will already be experienced with research reports. For the marketing profession, it is of utmost significance to train experts who are not only up-to-date in theoretical issues but also have a useful insight into practice. For this, they need to face real-life situations within the context of educational programmes and leave the university with a knowledge that can serve as a firm basis for their careers.

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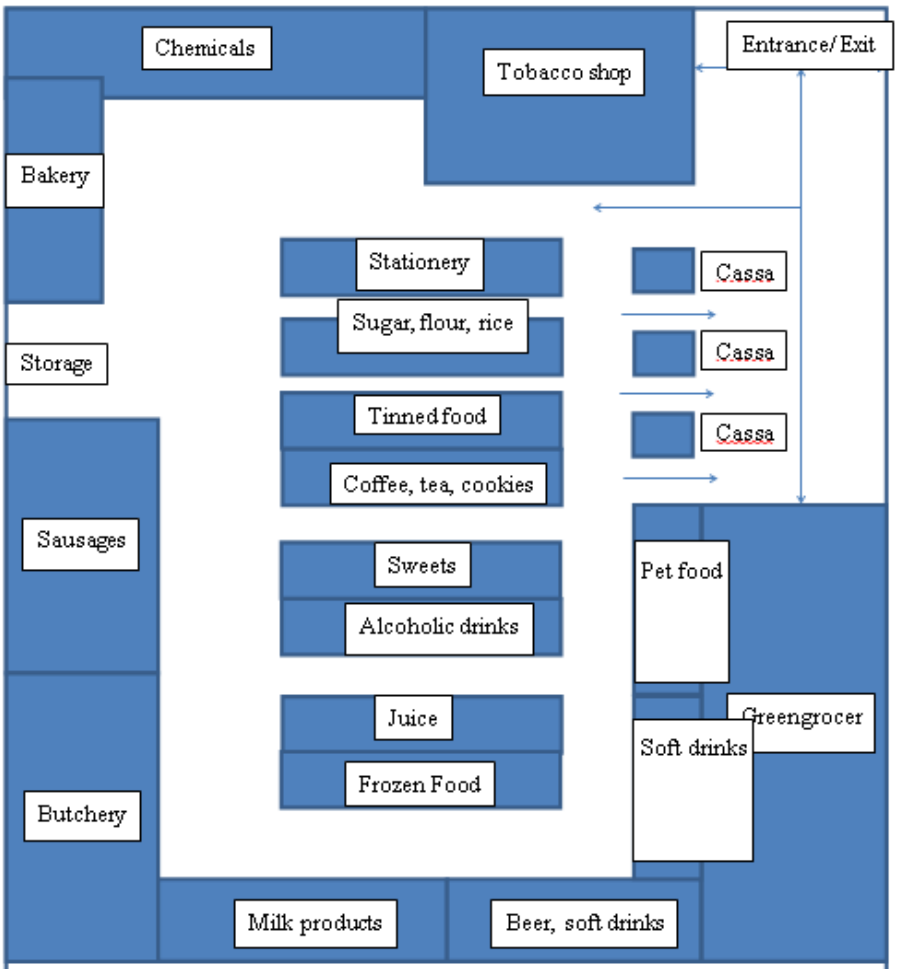
Figures:

• Figures 1: Layout of the store



• Figures 4: Heatmap of sweets gazing

SmallWorld: A Test and Training System for the Cyber-Security

Angelo Furfaro
Antonio Piccolo
Domenico Saccà
DIMES, University of Calabria, Rende (CS), Italy

Abstract

Powerful malware infects millions of computers every day and data breaches continue to increase. Cyber-Security incidents grow in frequency, the costs of managing and mitigating breaches also are rising. This situation demands for a suitable number of information security specialists to adequately handling issues arising in such a complex domain. This paper describes SmallWorld, a scalable software platform designed to reproduce realistic scenarios achieved by the immersion of real systems into a virtual environment with a fully integrated support for teaching with the aim to provide a venue for practical education in the learning and usage of all tools, techniques, and best practices employed to protect the confidentiality, integrity, authenticity, and availability of a designated information service. This software can be successfully adopted during high school, university and specific training to improve the quality and the results of the courses.

Keywords: Cyber-security, teaching, training

Introduction

Cyber security issues have an ever increasing social-economical impact both for citizens and enterprises, then the availability of tools allowing to improve the awareness of cyber-space threats, to learn how handle them and to assess the effectiveness of prevention and defense solutions is critical for the safeness of IT services. Traditionally, security assessment and penetration testing activities are performed on real networks while the training of security specialists is made on insulated and static virtualized systems. This paper proposes *SmallWorld*, a software platform enabling the assessment, teaching and learning of security-related aspects in different areas and for various purposes.

One of the main features of *SmallWorld* is the support for designing and building complex scenarios which are dynamic and reactive and where a

number of autonomous software agents can be deployed. Agents are able to reproduce the behaviors of human users and/or malicious applications into a scenario making it a more realistic training and testing environment.

SmallWorld can deliver to student the three types of learning outcomes defined in Computer Science Curricula 2013 document [1]:

- Familiarity, indicates the student theoretical comprehension of the proposed concepts. This is achieved via books and lectures available in the Content-Management-System of *SmallWorld*.
- Usage, indicates the student conceptual comprehension, he can apply it correctly when it's required. A mix of lectures and practical laboratory exercises usually achieves this.
- Assessment, indicates that the student can correctly recognize the given concept in practice, and correctly apply it as solution to some related problem. This is usually achieved via the training virtual environments and the Learning-Management-System available in *SmallWorld.*

Every content deployed in *SmallWorld* adhere to the NIST Cyber-Security Framework [2] created through collaboration between industry and government. The Framework consists of standards, guidelines, and practices to promote the protection of critical infrastructure.

Related Works

Most of the existing cyber security assessment tools act on real systems and virtual laboratories support only pre-built scenarios by developers or domain experts and do not allow for inclusion of real entities and traffic generation. A list of the main active projects on this subject is reported in the following

The main related work to SMALLWORLD is the **DeterLab** test bed [3], it offers scientific computing facilities for cyber security researchers engaged in research, development, discovery, experimentation, and testing of cyber security technology. DeterLab allows configuring user and group accounts with assorted permissions. Each group can have its own pre-configured experimental environments made of physical machines running Linux, BSD, Windows, or other operating systems. Users running DeterLab experiments have full control of real hardware and networks running pre-built software packages.

eLearningSecurity [4] offers certification, virtual labs and courses on cyber security;

The Hacker Accademy [5] has a web-based platform for experiencing, and teaching information security from the hackers perspective;

PENTESTIT [6] allows to emulate IT infrastructures of real companies, created for legal penetration-testing and for empowering

penetrating skills. Laboratories are always unique and contain the most recent and known vulnerabilities.

Pentest laboratory [7] offers a testing lab environment that includes all of the hosts, network infrastructure, tools, and targets necessary to practice penetration testing. However this solution is limited to a single scenario with four hosts, two networks and a firewall. In addition it is tied to GNU/Linux platforms.

The above solutions compared to SmallWorld have many limitations. In general they are not cloud oriented, so they are not scalable and it lacks the possibility to reproduce certain kinds of attacks, like user oriented attacks, because it would need the user interaction. SmallWorld overcomes to these difficulties introducing smart Agents provided with different behaviors allowing them to act as real users inside a scenario.

SmallWorld Architecture

SMALLWORLD has been developed with the main objective to be extensible and hypervisor-independent. To achieve these goals, it has been designed as multiple layers system, where the components of each layer cooperate among them to implement higher abstraction level services by exploiting the underlying tiers. A schema of the resulting architecture is reported in Fig. 1.

The five layers of the SMALLWORLD architecture are briefly described in details by the following subsections.

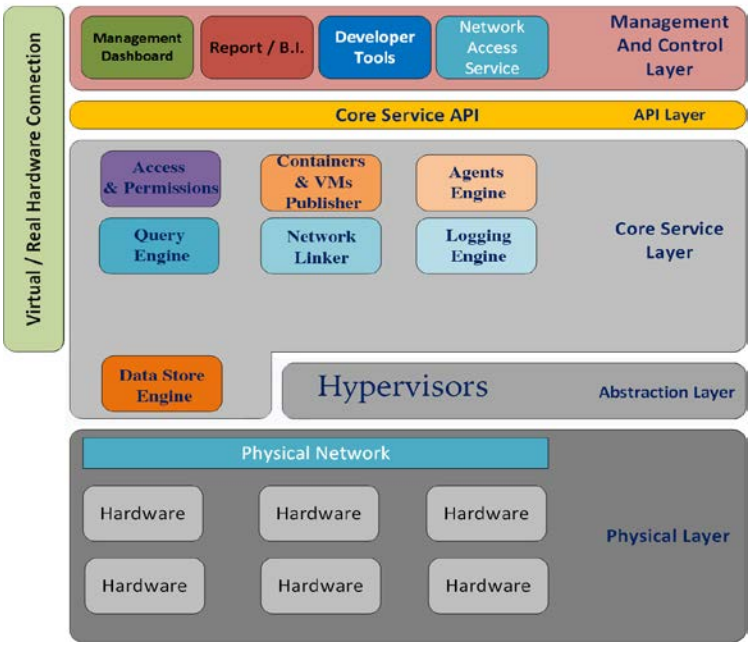


Figure 1

The Physical Layer hosts computational, storage and networking hardware configured in a suitable way in order to offer fault tolerance, business continuity and data replication mechanisms services for proper and scalable operation of the hypervisors. The above hypervisor layer abstracts and hides bare metal details that can then be easily changed for scalability purposes without impacting on the overall system operations.

The Abstraction Layer hosts the virtual machine monitor and the network hypervisor, which respectively enable to define via software the virtual computational nodes, along with the above operating systems and software layers and the virtual network infrastructure. There exists many hypervisors solutions that offer these features, OpenStack [8] is currently in use.

The Core Service Layer hosts the main software component that implements the core SmallWorld features, which are in turn, exposed by the above API layer. These components exploits the hardware abstractions offered by the hypervisors.

The API Layer is used for the implementation of the applications of the Management and Control Layer and is the key to implement the SmallWorld scenarios design and development toolkit independently from the software technologies used in the underlying layers.

The Management and Control Layer introduces the following facilities:

- A Dashboard, from where is possible to manage the scenarios, agents and virtual machines. It also allows to display system usage and statics, set scenario parameters, handle students access and account management.
- A Report tool, which provides statistical data about the running scenarios and the results of the exercises.
- A set of Development Tools that include an agent development tool, a scenario development tool and a virtual-system development tool.

Users can use these tools to easily build a new laboratory or load a preconfigured scenario. One of the SmallWorld main strength is the rich catalog of vulnerable software, operating systems, network templates and agent behaviors delivered with the platform.

A Case Study

In this section we present a case studies implemented in SmallWorld, figure 2, and that will be used during the cyber-security course at the University Of Calabria and and training laboratory during the second Cyber-Security Master course organized by Poste Italiane in collaboration with the PosteCERT and the University of Calabria.

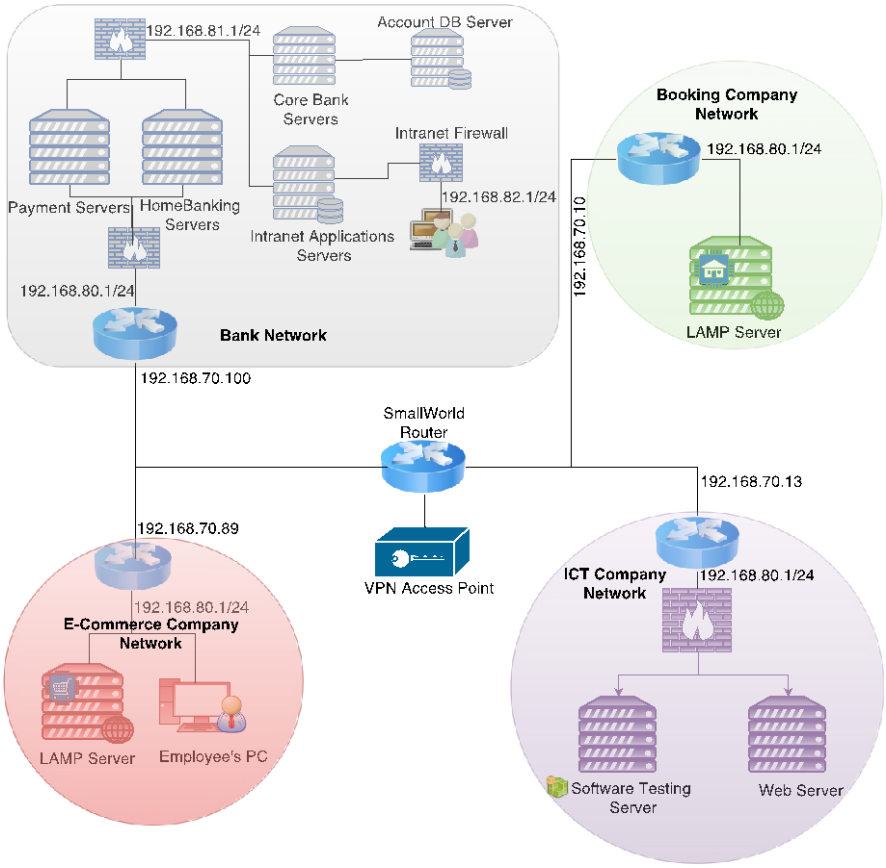


Figure 2

In this large computer network, many kinds of exploit and attacks techniques can be practiced. Each device and machine deployed is affected with al least one unique vulnerability with the purpose to allow students to “capture the flag” moving horizontally in the network from a start point to the end point, represented for example by an information contained in the servers of the bank.

Figure 3, shows as an hacker, in our case a student, can exploit a Stored XSS vulnerability in the E-Commerce system to stole the credentials of an employee or of the administrator. The malicious code is included as comment when the hacker place and order and it will be executed when the employee will check the new orders. At this point the cookies are stealthy stolen and sent to a server controlled by the hacker that now can impersonate the employee and have access to the back-end and to users and payments informations, furtheremore he can install a backdoor on the server and use it as a bot for future attacks.

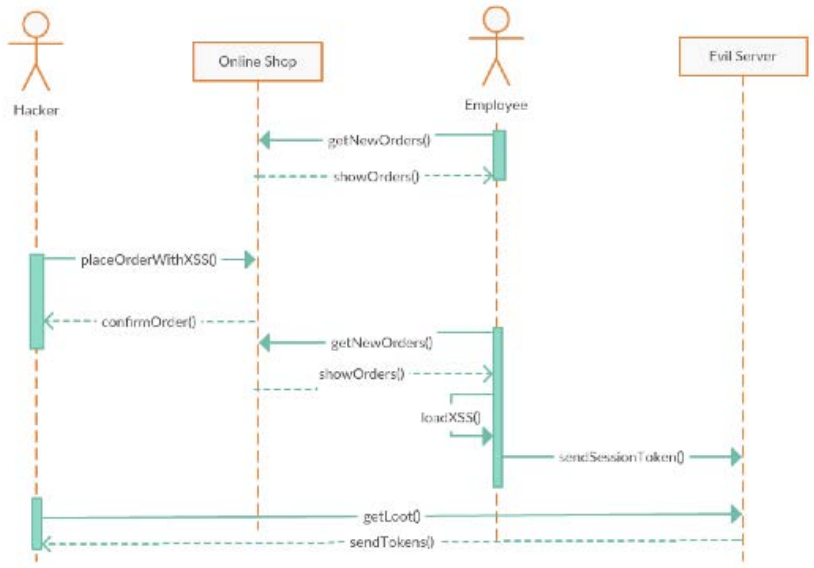


Figure 3

Unfortunately, we can't expose too many details about the vulnerabilities deployed in the scenario and how to exploit them because, as mentioned before, it will be soon officially used in two master courses.

Conclusion

Schools, University and also companies need a system to provide training courses, examples and laboratories built on top of real-like challenges and to configure them in an easy and quick way. Employees need to smoothly learn how to safely live in a cyber space by increasing their awareness of threats before exposing themselves to real risks. Researchers working in cyber-security need a great amount of real-like system logs, security environments to test new algorithms or to study malware propagation. Everyone can start soon to access the SmallWorld cloud and play with the preset content or customize the environment according to his needs.

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Implementation Of Total Quality Management To Improve The Poultry Feed Manufacturing Processes

Salloom A. Al-Juboori
Faculty of Engineering, Muta'h University, Al- Karak, Jordan

Abstract

This work is aimed to apply the basic concepts of Total quality Management (TQM) on process improvement of feed mill plant and to show the practical benefits of implementation of these concepts to improve the feed quality of poultry feed manufacturing processes, which suffers from low quality feed in a poultry enterprise as a field study. A special focus is made on the use of the basic quality tools to improve the production process by increasing Pellet Durability Index (PDI), where the 10 days durability index of the product has been monitored and analyzed using cause-effect-diagram and control-charts techniques. The analysis shows clearly that the feed producers can be effectively improved their production processes, when the grinding was changed from 6 mm and 8 mm sieves to 3 mm and 4 mm sieves with a moisture of 12%, the improvement was about 13 to 14%.While when the moisture is raised from 12% to 17%, the PDI% has increased to about 6 to 8%. Consequently, these improvements will save money, materials and make their processes sustainable with high quality.

Keywords: Pellet, TQM tools, PDI, Feed Particles size, Moisture

Abbreviations

PDI = Pellet Durability Index,
TQM= Total Quality Management,
PDCA= Plan, Do, Check and Act,
SPC= Statistical Process Control,
UCL= Upper control limit
LCL= Lower control limit
USL= Upper specification limit
LSL= Lower specification limit

Problem Analysis

There are three main factors which have a great impact on the feed process [1, 2 and 3], these are:

(a) Pellet

In the Feed mill plant (the field study of this work), the production consists of five main work stages: the Receiving, grinding, mixing, pellet and warehouse. The factory produces different type of poultry feed (Starter, Grower and Finisher). Pellet process represents the heart of the manufacturing process. Pellet can be generally defined as an extrusion type thermoplastic moulding operation in which the finely reduced particles of the feed ration are formed into a compact, easily handled, pellet. It is thermoplastic in nature because the proteins and sugars of most feed ingredients become plastic when heated and diluted with moisture. The moulding portion of the operation occurs when this heated, moistened feed is forced into a die, where it is moulded into shape and held together for a short time. It then exits as an extruded product. Pressure for both moulding and extrusion comes from pellet mill rolls which force the feed through the holes. There are many financial advantages of the pellet feed product, which are:

* The combination of moisture, heat and pressure acting on natural starches in feed Ingredients produce a degree of gelatinization**.** This enhances the binding qualities of The starch-containing ingredients resulting in better pellet quality**.** This improved feed Conversion advantage is particularly evident in the Poultry Industry.
* Pellet feed prevents selective feeding on favoured ingredients in a formulation. Since all Ingredients have been moulded together; the animal must eat a balanced formulation, Minimizing waste and improving feed conversion.
* Pellet prevents segregation of ingredients in handling or transit. With medicated feeds And concentrates, this avoids disproportionate concentrations of micro-ingredients and Resultant ill effects.
* Pellet has been shown to reduce moulds in feed, again increasing feed conversion.
* Pellet increases bulk density, particularly on alfalfa, beet pulp and gluten feeds. For instance, the alfalfa pellet, the bulk density can be increased by a ratio of 2 to 1. Densification, of course, is depending on product characteristics being pellet. In baggy, the product of the sugar is an extraction process will get a densification from 8 to 32 pounds per cubic foot. The advantages in storage and shipping are self-evident: higher pay loads and reduced Bin requirements.
* Round, densities pellets have much better handling characteristics, which is simplify bulk handling. Often it would be impractical to handle ingredients in bins if they were not a Pellet. There are also instances where extremely free flowing ingredients will be flood out of bins. Pellet produces a form which can be easily controlled.

* Feed in pellet form reduces natural losses**.** Feeding ranges of cubes to Bird is the application of this advantage. Wind losses from feed bunkers can also be reduced by pellet usage.

(b) Factors influencing pellet quality:

Pellet quality is dependent upon several factors, (figure-1 shows % representation) such as:

1- Feed formulation: 40%
2- Feed particle size: 20%
3- Conditioning: 20%
4- Die specifications: 15%
5- Cooling: 5%

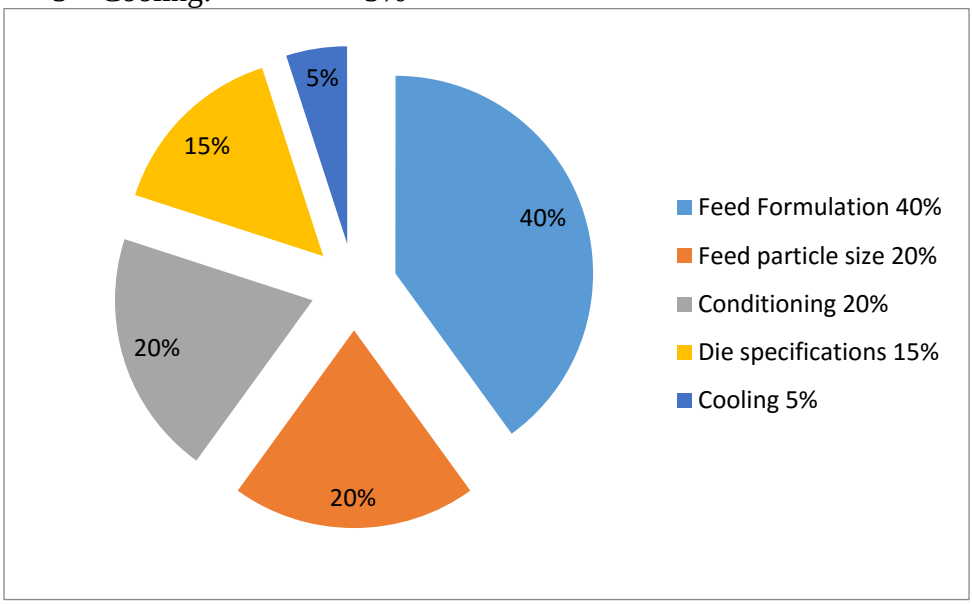


Figure 1 Factors influencing pellet quality [1]

The considerations of each factor can be explained as follows:

*** Feed Formulation:** Typically, least-cost formulation is used to minimize the feed cost based upon the nutritional needs of the animal. However, the least-cost formulation;

Is the result of the feed that produces a poor-quality pellet? Although formulating for Pellet quality may not be entirely possible; the following basic guidelines can help:-

- Generally, the addition of fat to feed mash before pellet causes lower pellet quality. Adding more than 2 percent fat at the mixer into corn-soy diets can cause excess fines and low pellet durability. If higher levels are needed, add the fat through post-pellet application systems.

- Increasing protein and fibber contents in feed tends to improve pellet quality
- Certain feed ingredients contain "natural" binding properties that help to improve pellet quality. Examples include wheat, barley, canola, whey and blood plasma.

*** Feed particles size:** Generally, smaller mash particle size will enhances the pellet quality since the material has a larger surface area that allows heat and moisture from steam to more quickly and thoroughly penetrates the particle. Smaller particles also have more surface area to adhere and bind to other particles in the pellet. However, the cost of grinding to obtain smaller particle sizes needs to be weighed against the benefits of improved pellet quality. The range of the optimal particle size for corn-soy poultry dies from a cost-benefit stand point may be in of 650 to 700 micron range.

*** Conditioning:** The conditioning process influences the pellet quality are more than die specifications. In contrast, thicker dies that lower production rates often are used in an attempt to improve pellet quality. The some guidelines of conditioning to be considered are:-

- Generally, increasing the conditioner retention time improves pellet quality. The longer retention time improves heat and moisture absorption in feed. Lengthen the retention times of an existing conditioner by adjusting pick angles or reducing the conditioner shaft speed.
- Steam pressure does not influence pellet quality. The thermodynamic properties of low- and high-pressure steam are very similar. To optimize energy costs, maintain steam pressures only high enough to provide the steam quantity necessary to reach desired conditioning temperatures and for adequate condensation removal/return.
- Typically, steam cannot provide more than 6 percent moisture to feed during the conditioning process. Each percent of moisture added to feed through steam raises the mash temperature about 23 F^0.
- Steam quality – the percentage of steam in the vapour phase – is important to pellet durability and production rates. Research has shown that conditioning feed with 70 to 80 percent steam quality optimizes pellet durability. High-quality steam has more energy to raise mash temperature than lower-quality steam that contains condensation. Steam quality determines the maximum mash temperature that can be reached during conditioning because of moisture limits.

***Pellet Die Material and Specifications:** Understanding the terminology used to describe dies is important when choosing die specifications. Die working area is defined as the area between the two inside die grooves. This working area increases as die width and diameter increase. Die working area is important because different feeds and ingredients require specific amounts of time in the die hole (die retention time) to be able to bind together to form a pellet. Larger die working areas provide more retention time to form pellets, reduce power consumption per ton of feed pellet and improve production efficiencies.

*** cooling:** Poor cooling reduces pellet durability. Proper pellet cooling depends upon adequate airflow and cooler retention time. Poor pellet cooling in vertical and horizontal coolers often is attributable to airflow restrictions caused by plugged cooler screens, trays or air inlets. Product build-up in cooler ductwork also can cause problems in all types of coolers. Increasing feed bed depth can increase retention time in horizontal coolers. Typically, if greater retention time is needed, adding additional height to cooler walls or horizontal sections is done to increase the cooler's surface area.

(a) Pellet Durability Index (PDI %) Test: Continuous monitoring and measurement of pellet and cube quality by the pellet mill operator will help assure that a more consistent quality product is produced and shipped from the manufacturing plant. This test is used to measure pellet and cube quality as will be described below with the results logged and compared on the daily production record. Tests can be performed on each daily production run and comparisons between like runs can be made to help establish and determine minimum standard of quality. Changes in ingredients, formulations, equipment, or production methods can then be tested and compared to the minimum standards that are established for that particular finished pellet product. As improvements are made in pellet quality, as measured by higher PDI %, then the minimum quality standards can be increased along with increased customer satisfaction with the finished product.

(b) Implementation of Quality Tools: In this section, a review of the basic concepts of process improvement is made followed by a brief description of the seven basic quality tools. A discussion of the published technical literature on the use of these tools for the improvement of the construction processes is then presented [4,5,6,7,8,9,10,11,14,16,and 17].

*** Basic Concepts of Continuous Process Improvement:** A fundamental question is always raised in front of business leaders "Do we really need to improve our processes? Edwards Deming [12], in his book "out of the crisis" published in 1986; answered this question in his famous chain reaction shown in figure 2. The benefits from quality and process improvements to all types of organizations are including the construction business:-

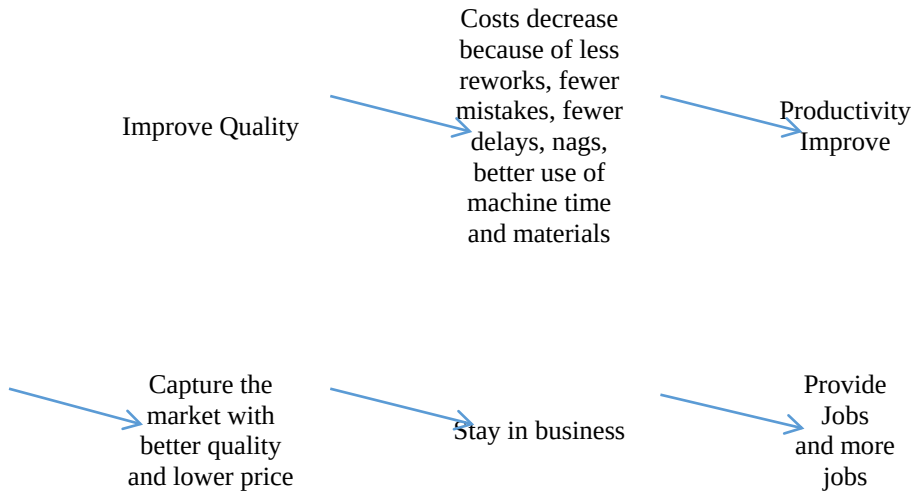


Figure 2 Deming's chain reaction [16]

 # <u>How to ensure Continuous process improvement</u>? The most common process of continuous improvement is the PDCA Cycle, which was first developed by Walter Shewhart in the 1931 [20], and promoted effectively from the 1950s by quality guru Dr Edwards Deming [sited in7], as a strategy to achieve breakthrough improvements in processes. The four steps in the cycle which is also known as the Deming Wheel are as shown on figure 3.

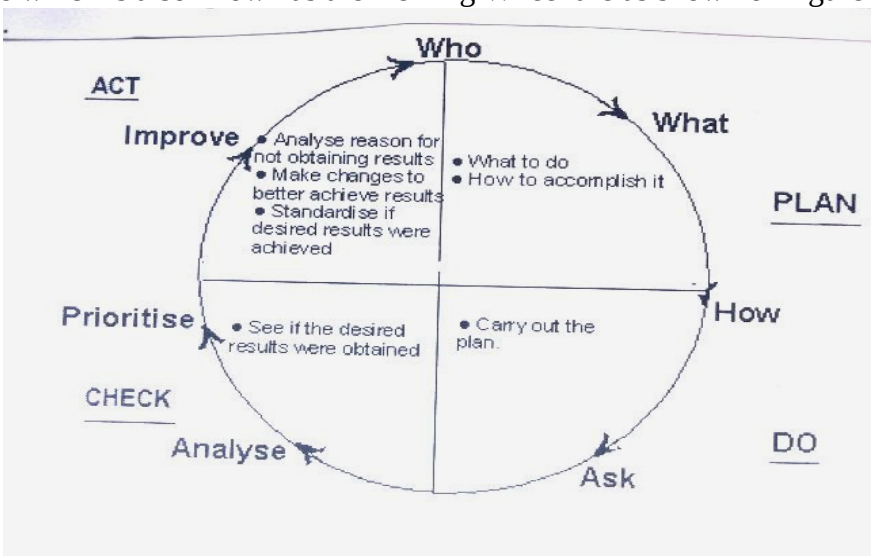


Figure 3 The Deming's Wheel (PDCA Cycle) [7]

Seven phases have been identified by quality scholars to implement the PDCA cycle in the improvement process of an organization:

Phase 1 - Identify the Opportunity for improvement

Phase 2 - Analyze the Current Process
Phase 3 - Develop Optimal Solutions
Phase 4 - Implement Changes
Phase 5 - Study the Results
Phase 6 - Standardize the Solution
Phase 7- Plan for the Future

 # The Seven basic Quality Tools: Once the quality improvement process is understood, the addition of quality tools can make the process proceed in a systematic manner. Many quality tools are available for quality professionals for this purpose. Many organizations use total quality management (TQM) tools to identify, analyze and assess qualitative and quantitative data that are relevant to their processes [7, 11, 12, and 15]. These tools can be generally classified to three major categories namely the basic seven quality tools, the seven new tools for management and Planning and other tools. The seven basic quality tools are simple tools that can be used by any professional to ease the quality improvement process. These are: flowcharts, check sheets, Pareto diagram, cause and effect diagram, histogram, scatter diagram, and control charts. These tools were originally developed by Kaoru Ishikawa [14], one of the pioneers of the Japanese quality movement. Ishikawa's original list did not include flowcharts; instead, it had graphs as one of the tools. These seven basic tools have been considered a part of Statistical Process Control (SPC), a quality management system that uses a set of tools to analyze, control, manage, and improve process quality. But not all seven tools are quantitative, let alone statistical. The flowchart is simply a visual description of a process. A cause-and-effect diagram is a brainstorming/based problem/solving procedure. Check sheets and Pareto diagrams are simply commonsense tools. Histogram, scatter diagram, and control charts are the only statistical tools in the list.

Quality Pioneer Ishikawa believed that 95% of quality-related problems in any organization can be solved with these basic tools. This statement has been proven by many organizations and researchers as it will be shown later. The key to their success in problem-solving and process improvement initiatives are their simplicity, ease of use and their graphical nature. The tools were originally meant to make process analysis less complicated for the average factory worker in Japan, but now they constitute standard analytical tools to analyze quality problems and develop and identify optimum solutions and standardise them. They can easily be taught to any member of the organization. These tools have been widely used in manufacturing and services organizations embracing process/improvement initiatives within the Total Quality Management (TQM) and Six Sigma approaches or the excellence models.

A brief description of these tools will be discussed as follows:-

*** *Flow-chart*:** A graphical display of the process steps in proper sequence. A flowchart shows all process steps under analysis by the quality improvement team, identify critical process points for control, suggest areas for further improvement, and help, explain and solve problems.

When to use: When a team is working on process improvement, it is first necessary for all members of the team to have a common understanding of the process. Flowcharts are also a necessary stage in the introduction of ISO 9000.

How to use: Having the correct team is essential when drawing a flowchart. It is necessary to involve all those who are concerned with the process .There are a simple procedure to follow when drawing a flowchart:

1- Brainstorm all the individual activities that make up the process.

2 -List the activities in the order in which they are done.

3 -Using wallpaper or some other large sheets of paper, then draw out the activities in schematic form.

4 - Ask each member of the group in turn whether any of the activities have been missed out and whether he or she agrees with the process as drawn. Then make changes if necessary.

5 -Test the flowchart by taking an example and 'walking it through' the flowchart.

Benefits: Often processes in organizations are not designed, but have evolved over time. Flowcharting allows processes to be challenged, and gaps, duplications and dead ends identified. It therefore leads to process simplification.

*** Check-sheet:** It is a structured, prepared form for collecting and analyzing data.

Also it is and a generic tool can be adapted for a wide variety of purposes.

When to use: Can be either during problem definition when you are collecting data to find out what is happening, or when you have implemented a solution and you are collecting data to monitor the new situation.

How to use: There are five simple steps to draw a check sheet diagram:

1 - Collecting the data to be drawn.

2 - Design the check sheet.

3- Test the check sheet using someone who has not been involved in the design. Let him or her to use the check sheet without assistance. If necessary, it is possible modify the check sheet.

4 - Design a master check sheet: If more than one person has to be involved in data collection. You will need to bring together all the data collected. The way to do this is to use a master check sheet.

5 - Collect the data.

Benefits: By establishing the facts about the incidence of failure, a team can plan to identify the causes of failure and look for ways of removing them. Actions are taken on the basis of evidence, not feeling. Check sheets are an excellent way of involving people in quality improvement. They give a simple method of data collection that can be easily understood and applied in a wide range of areas.

*** Pareto-chart:** To separate the most important causes of a problem from the many trivial. Also, to identify the most important problems for a team to work on Pareto analysis was first used by Wilfred Pareto [sited in 11], an Italian economist.

When to use: When a team is analysing data relating to a problem to decide which are the most important factors to be tackled first to have the most impact on the problem.

How to use: Pareto analysis is sometimes called the 80/20 rules. This means that 80 per cent of the problems are caused by 20 per cent of the activities and it is this important 20 per cent that should be concentrated on. There are six simple steps involved:

1- List the activities or causes in a table and count the number of times each occurs.

2 - Place these in descending order of magnitude in the table.

3 - Calculate the total for the whole list.

4 -Calculate the percentage of the total that each cause represents.

5 - Draw a Pareto diagram with the vertical axis is showing the percentage and the horizontal axis the activity or cause. The cumulative curve will show the percentage of the cumulative for all causes.

6 -Interpret the results.

Benefits: When working in teams it can be difficult to reach agreement when people with different opinions want to follow different courses of action. Pareto analysis brings the facts to the attention of all members of the team to aid decision-making.

*** Histogram**: The most commonly used graph for showing frequency distributions, or how often each different value in a set of data occurs.

When to use: At the early stages of problem-solving when a team is trying to find out what is happening.

How to use: There are four simple steps involved:

1- Collect the data using a check sheet.

2- Use the vertical axis to display the number of times each value occurs.

3- Use the horizontal axis to display the values.

4- Interpret the histogram.

Different patterns of histogram suggest that the problem being studied has particular characteristics. Patterns reveal when two or more things are being mixed; for example, different ways of processing claims. They also show when data are being censored; for example, when someone is failing to record certain data items. They can also indicate when there is time dependence in the data; for example, when something can take a very long time but when it is impossible to take a short time.

Benefits: Assumptions of normality made about data need to be checked before data can be analysed using statistics that depend upon normality. Histograms are a simple visual way of viewing data that highlights non-normal situations. When these are identified, the data can, if necessary, be analysed further.

The picture will show the useful advice for the teams trying to establish facts about what is happening.

***Cause-and-effect diagram*:** Also called Ishikawa or fishbone chart [14], which identifies many possible causes for an effect or problem and sorts ideas into a useful categories.

When to use: When a team is trying to find potential solutions to a problem and is looking for the root- cause.

How to use: There are four steps to constructing a cause and effect diagram.

1- Brainstorm all possible causes of the problem or effect selected for analysis.

2- Classify the major causes under the headings: - Which are materials, methods, machinery, and the manpower?

3- Draw a cause and effect diagram.

4 -Write the effects on the diagram under the classifications chosen.

Benefits: When a problem or effect is being analysed, it can be tempting to look for a temporary solution or quick fix that does not solve the problem at all but simply 'gets round' it. Cause and effect analysis allows the problem to be considered fully and all options considered. It also points to possible areas for data collection.

*** Scatter diagram**: It is Graph pairs of numerical data, one variable on each axis, to look for a relationship between process variables.

When to use: Scatter diagrams are used when a group is trying to test whether a relationship exists between two items - often a cause and effect.

How to use: There are four simple stages to draw a scatter diagram:

1- Collect data about the causes and effects.

2- Draw the cause on the horizontal axis.

3- Draw the effect on the vertical axis.

4 -Draw the scatter diagram.

Benefits: Scatter diagrams help to bring the facts to bear when discussing the problems and they help to reduce the amount of 'gut feeling' involved within problem. Also they can solve the word of caution. Just because there appears to be a relationship it does not mean that one thing causes another. The relationship might is be fortuitous or through a third unknowns, variable, if a relationship appears to have been found, proof must be sought

*** <u>Control charts</u>**: They are used to identify when the number of defects in a sample of constant size is changing over time.

When to use: When monitoring a process to detect changes or, when a change has been made. To process inputs and to find output whether the number of defects or problems is also changed. C- Charts are used when the sample size is constant, or does not vary by more than 25 percent of the average sample size.

How to use: There are six simple steps involved:-

1- Collect data showing the number of problems or defects over time.

Draw up a table showing the number of defects for each lot number.

The number of defects is called "C". The total number of lots is called" M".

2 -Plot the data from the table onto the C-control chart. The successive lot numbers are shown on the horizontal axis. While the number of defects or problems are shown as C on the vertical axis

3 -Calculate the centre line C-bar. This is calculated as the sum of all the Cs divided by the sum of all the Ns and, it can be written as;

$$C\text{- Bar} = \sum Cs / \sum Ns$$

4- Calculate the control limits which are ± 3 about the central line. They are calculated as:-

Upper control limit (UCL) = (C –bar) + 3 $\sqrt{}$(C- bar)

Lower control limit (LCL) = (C –bar) - 3 $\sqrt{}$(C- bar)

If the lower control limit is less than zero it is taken to be zero.

5- Draw the central line and the control limits on the control chart.

6- Interpret the results.

Benefits: It can be difficult to separate out random variation (often called common cause or non-assignable variation) from real variation caused by changes to the process.

C-Charts give a way to do this for the number of defects or problems with a sample size that is constant.

Applications of the Basic Quality Tools in the Feed Manufacturing plant (The present work case study):-

As it was mentioned earlier, according to Professor Ishikawa 95% [14] of quality related problems in any organization can be resolved using the seven basic quality tools. Professor Nangana [sited in 4] named these tools as "The Magnificent Seven". These important statements can be proven from the amount and the quality of research papers and articles published by quality professionals and researchers in manufacturing and services. Feed manufacturing organizations are no exception to this flaw, they can greatly improve their processes and solve real problems in the field which hamper their efficiency and lead to customer and client dissatisfaction as shown from recent studies. Recent interest has been shown on the use of control charts to monitor and improve production processes. Poultry organizations worldwide and of course in the Feed manufacturers can continuously improve their processes to meet ISO 9001 requirements and achieve breakthrough improvements and business excellence by a systematic use of the basic quality tools together with the deployment of quality awards standards. The benefits gained by these business organizations fit well with the Deming quality chain reaction discussed in the previous section; just to recall these are: product quality improvement, costs decrease, productivity improvement, defect rate reduction, customer satisfaction and increased profits; all these benefits are obvious targets and even more, reasons for the existence of Poultry field business owners and organizations.

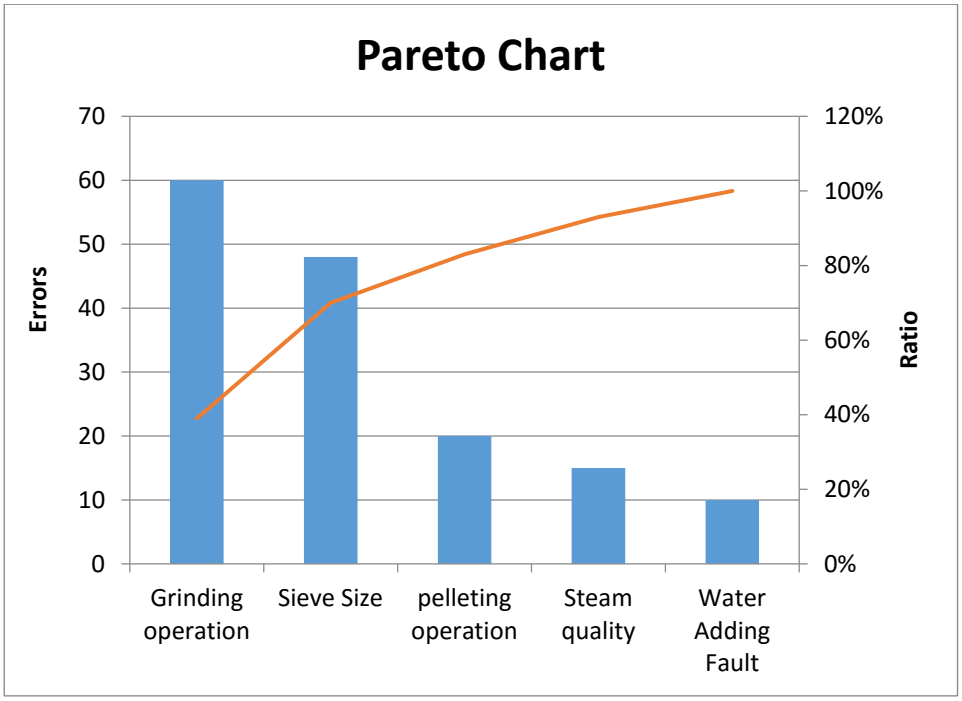
Research Methodology:

Feed mill plant has been taken as a case study; this factory is applying a quality inspection system in addition it has ISO 9001since 2003. The study conducted among 10 days with 10 samples (Grower and Finisher Feed) each day, the factory has an old record for the previous pellet process parameters and PDI results, and the losses that are observed in the production process. So the study has focused on using quality tools is relentlessly work on eliminating waste in pellet processes by concentrating on particles size and moisture parameters. The main stages of the present study as follows:

(a) Pareto-chart: Pareto-chart as shown in fig-4 is used in order to identify errors or problems causes of errors. While, table-1, shows the data collected from the production process.

Faults effect on PDI Value/Particle size and moisture		
Error type	Errors	Ratio
Grinding operation	60	39%
Sieve Size	48	31%
pellet operation	20	13%
Steam quality	15	10%
Water Adding Fault	10	7%
Total	153	100%

Table-1: Errors



Error Type Figure 4: Pareto Chart

(b) **Cause and effect diagram** as in fig-5 issued in order to analysis the problem in pellet
feed related to all causes.

(c) Improvements: The improvements will be carried in two main steps which are:

First step: Modifying grinding process is by changing the sieve from 6 mm or 8 mm to
3 mm or 4 mm,

Second step: Increase moisture from 12 to 16 by adding water and adjusting temperature in pellet process to 77- 80 C˚

Results of the First Step:

1- PDI% Results before performing the first step improvements :

a- PDI% results when grinding was by 6 mm or 8 mm sieves as shown in table-2 and figs-6 and 7:

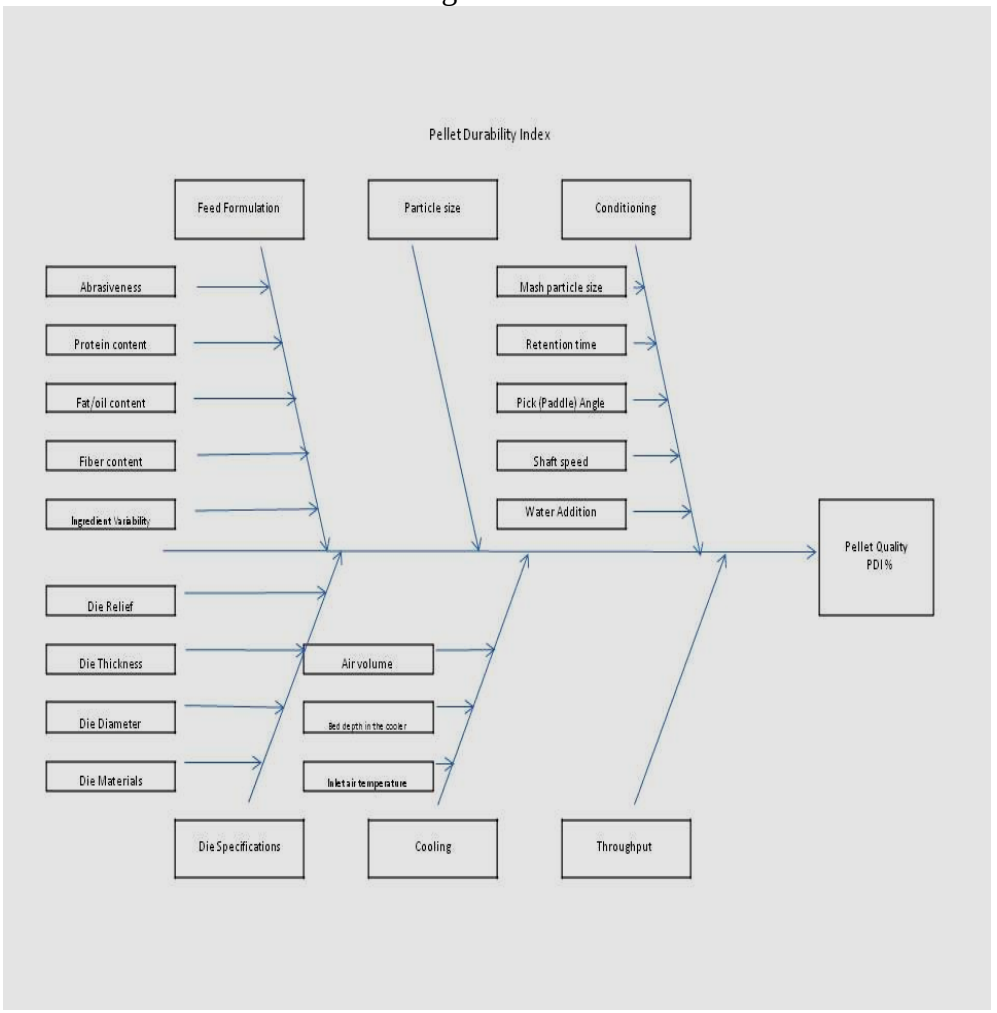


Figure-5 Cause –and- Effect diagram

PDI %/ grinding 6 mm,8 mm										
	Day									
sample	1	2	3	4	5	6	7	8	9	10
1	73.00	67.00	69.00	74.00	70.00	71.00	75.00	71.00	73.00	71.00
2	71.00	70.00	71.00	73.00	71.00	71.00	75.00	71.00	73.00	70.00
3	70.00	70.00	71.00	74.00	70.00	70.00	75.00	73.00	72.00	70.00
4	72.00	70.00	71.00	75.00	71.00	71.00	76.00	72.00	72.00	70.00
5	73.00	69.00	71.00	75.00	73.00	72.00	74.00	73.00	72.00	72.00
6	71.00	68.00	71.00	74.00	70.00	72.00	75.00	72.00	74.00	70.00
7	72.00	69.00	70.00	74.00	70.00	73.00	72.00	71.00	74.00	70.00
8	72.00	69.00	72.00	73.00	70.00	71.00	75.00	73.00	74.00	71.00
9	71.00	69.00	71.00	74.00	72.00	72.00	75.00	72.00	72.00	70.00
10	73.00	70.00	71.00	73.00	70.00	71.00	75.00	71.00	73.00	72.00

Table 2: PDI% results: grinding by 6 mm and 8 mm sieves

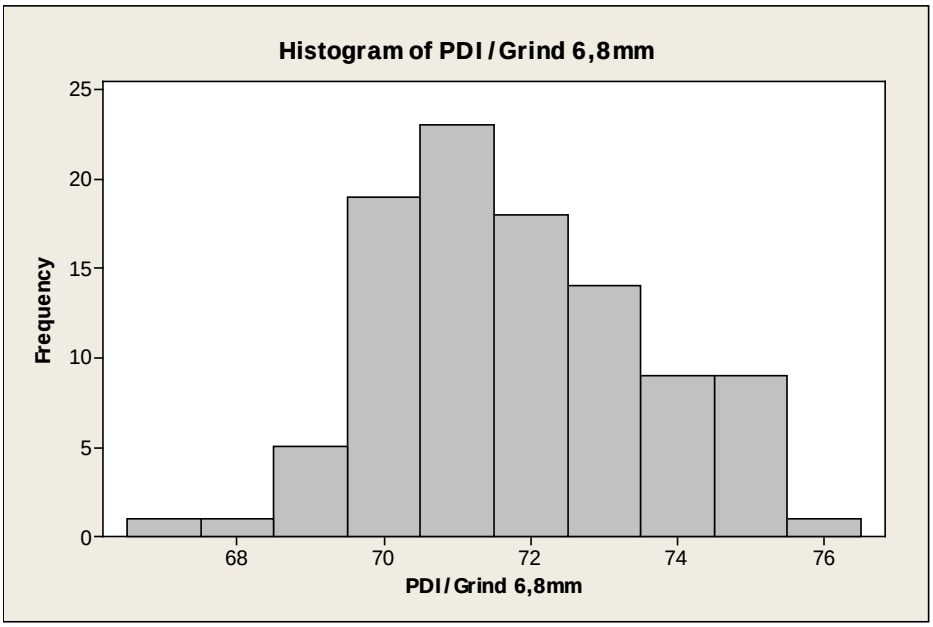
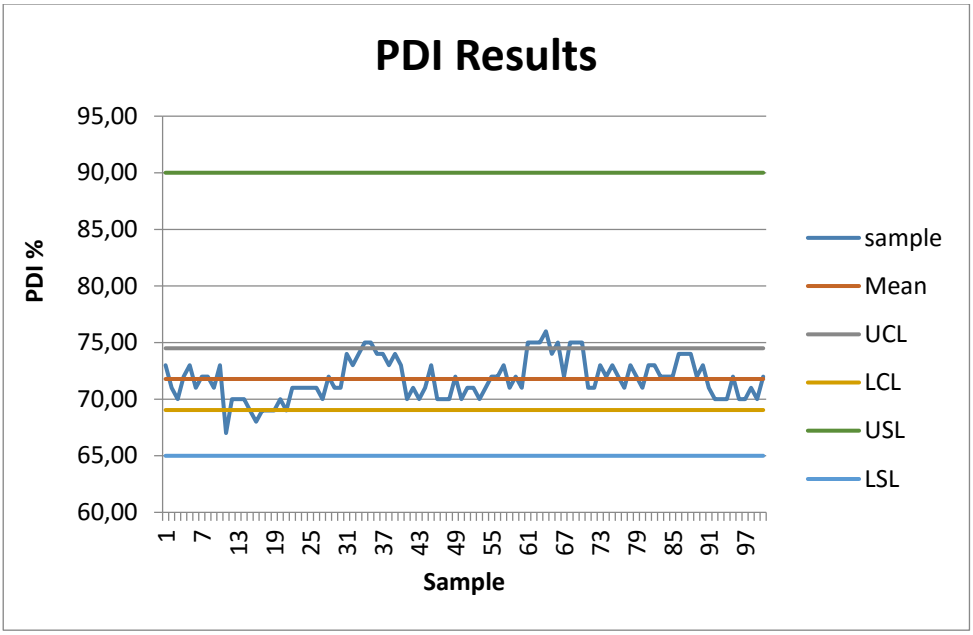


Figure 6: Histogram for the PDI results, grinding by using 6 mm or 8 mm sieves



Lot Numbers

Figure 7: Control Chart for PDI%, grinding 6 mm and 8 mm (Mean = 72.12, UCL =74.82, LCL = 69.42)

2 – **Results 0f PDI%** by changing grinding process to 3 mm or 4 mm sieves as shown in table-3 and figs- 8, 9 and 10 .

PDI % / grinding 3 mm,4 mm										
	Day									
sample	1	2	3	4	5	6	7	8	9	10
1	81.00	79.00	79.00	82.00	80.00	80.00	80.00	79.00	80.00	82.00
2	82.00	81.00	79.00	80.00	80.00	78.00	81.00	78.00	80.00	80.00
3	80.00	81.00	80.00	81.00	80.00	80.00	79.00	80.00	82.00	80.00
4	81.00	80.00	80.00	80.00	82.00	81.00	80.00	79.00	80.00	80.00
5	83.00	80.00	78.00	81.00	80.00	80.00	82.00	80.00	78.00	80.00
6	80.00	82.00	80.00	81.00	82.00	80.00	79.00	79.00	81.00	80.00
7	83.00	81.00	79.00	80.00	82.00	79.00	82.00	79.00	78.00	80.00
8	80.00	80.00	79.00	82.00	81.00	80.00	80.00	79.00	81.00	81.00
9	81.00	81.00	80.00	80.00	82.00	78.00	81.00	80.00	79.00	80.00
10	80.00	82.00	77.00	82.00	82.00	78.00	80.00	78.00	79.00	79.00

Table 3: PDI% results during 10 days/ grinding by 3 mm and 4 mm sieves

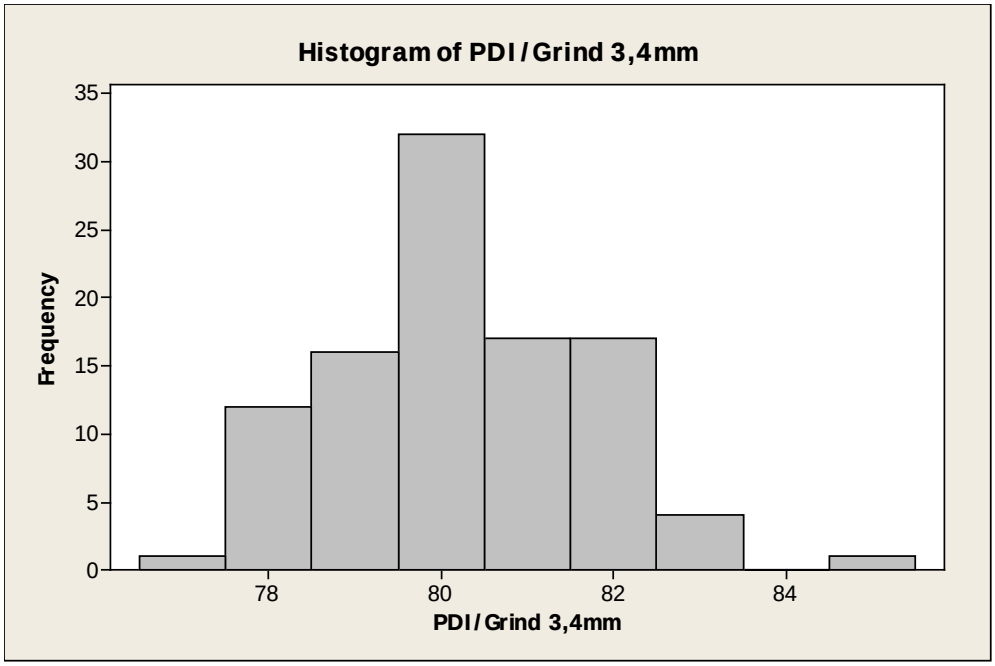
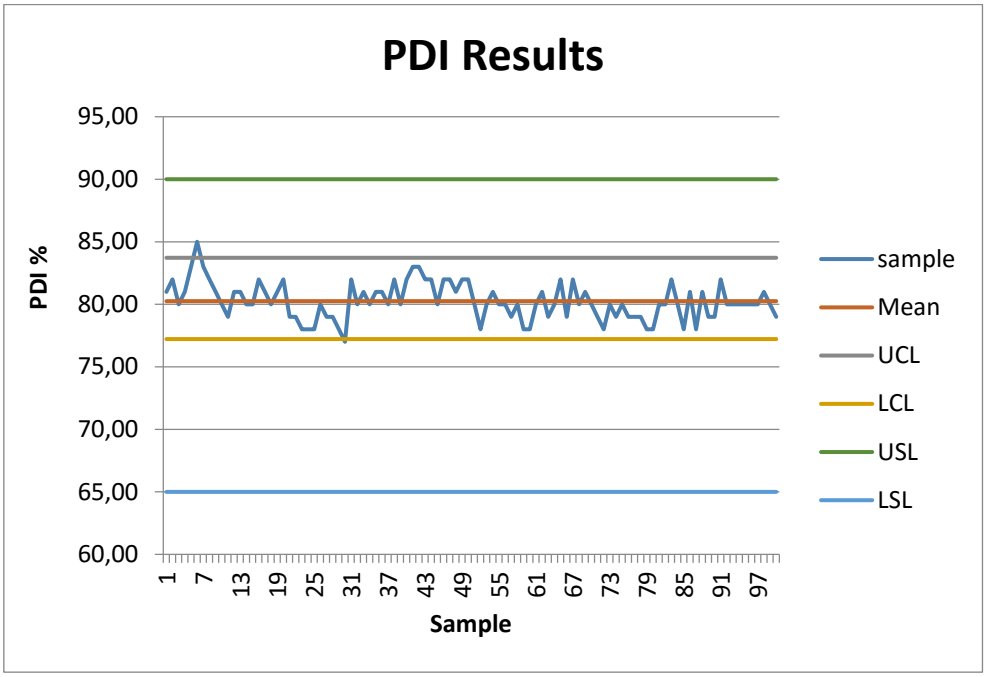


Figure 8: Histogram for the PDI results, grinding by using 3 mm or 4 mm sieves



Lot Number

Figure 9: Control Chart for PDI%, grinding 3 mm and 4 mm (Mean = 80.57, UCL =83.35, LCL = 77.79)

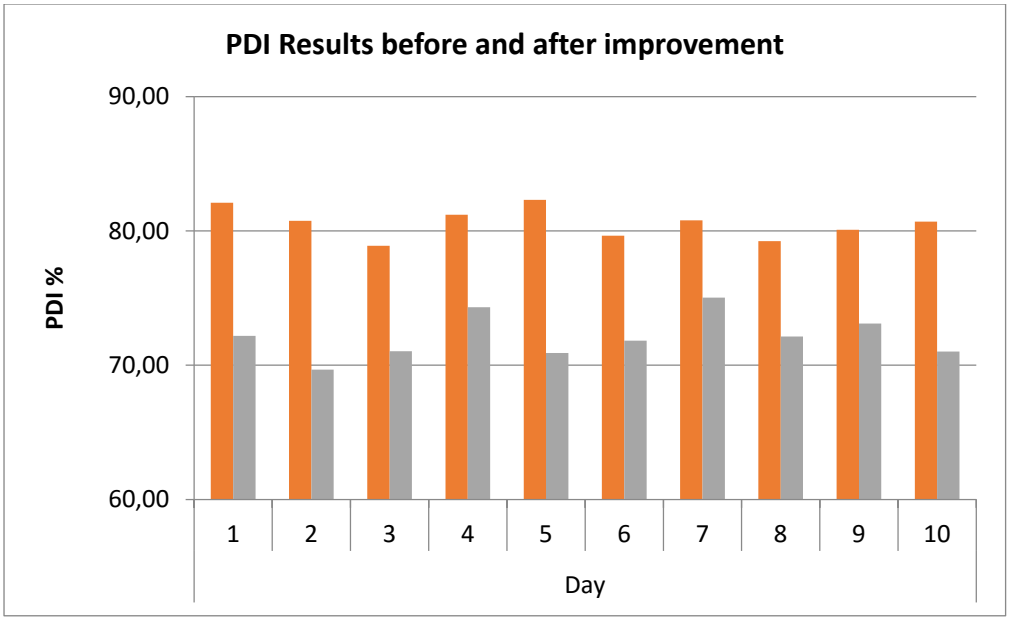


Figure 10: improvement Chart for PDI%, before and after grinding by 3mm and 4 mm (= after, = before)

Second step: Modifying the Moisture value in order to reach following targets:

1- Target 17-18% moisture.
2- Target 180-200 F^{o} temperature
3- 1% moisture increase per 20-25 F^{o} temperature

a- The Results when the conditioning temperature was 158-162 F˚ and moisture 12% as shown in table-4 and figs-11 and 12.

PDI % / Temperature 158-162 F˚ ,Moisture 12%										
	Day									
sample	1	2	3	4	5	6	7	8	9	10
1	81.00	79.00	79.00	82.00	82.00	80.00	80.00	79.00	80.00	75.00
2	82.00	81.00	78.00	79.00	83.00	78.00	81.00	78.00	80.00	80.00
3	80.00	81.00	78.00	81.00	82.00	80.00	79.00	80.00	82.00	80.00
4	81.00	80.00	78.00	80.00	82.00	81.00	80.00	79.00	80.00	80.00
5	83.00	79.00	78.00	81.00	80.00	79.00	82.00	80.00	78.00	80.00
6	80.00	81.00	80.00	81.00	82.00	80.00	79.00	79.00	81.00	80.00
7	83.00	80.00	79.00	80.00	82.00	79.00	82.00	79.00	78.00	80.00
8	82.00	80.00	79.00	82.00	81.00	80.00	80.00	79.00	81.00	81.00
9	81.00	80.00	78.00	80.00	82.00	78.00	81.00	78.00	79.00	80.00
10	80.00	84.00	77.00	82.00	82.00	78.00	80.00	78.00	79.00	79.00

Table 4 PDI% results during 10 days/ grinding by 3mm and 4mm sieves and moisture 12%

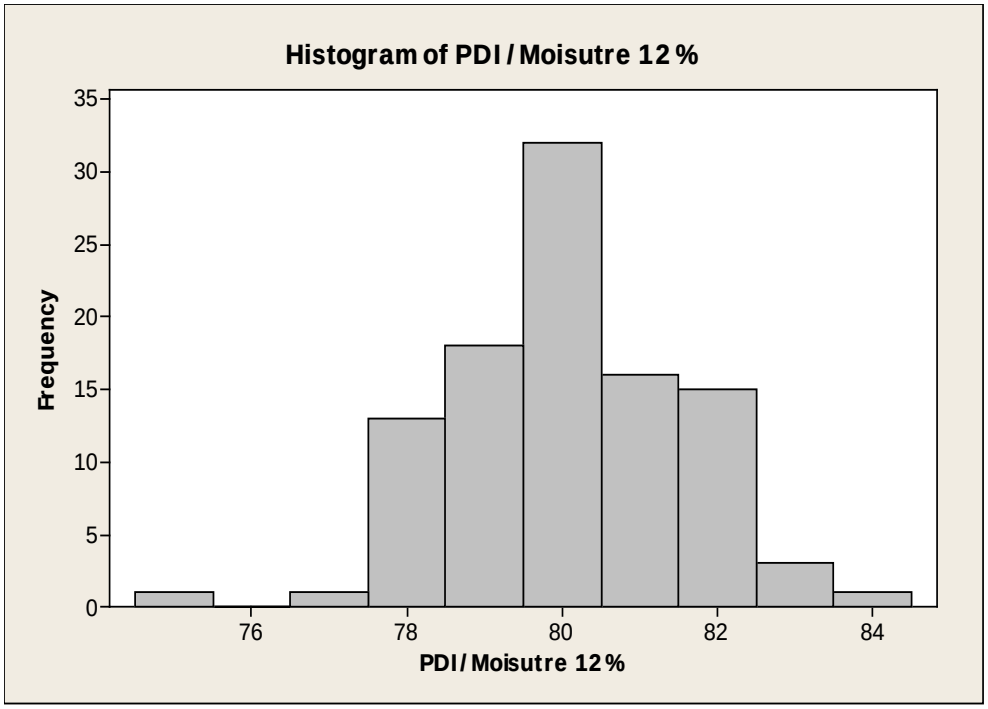
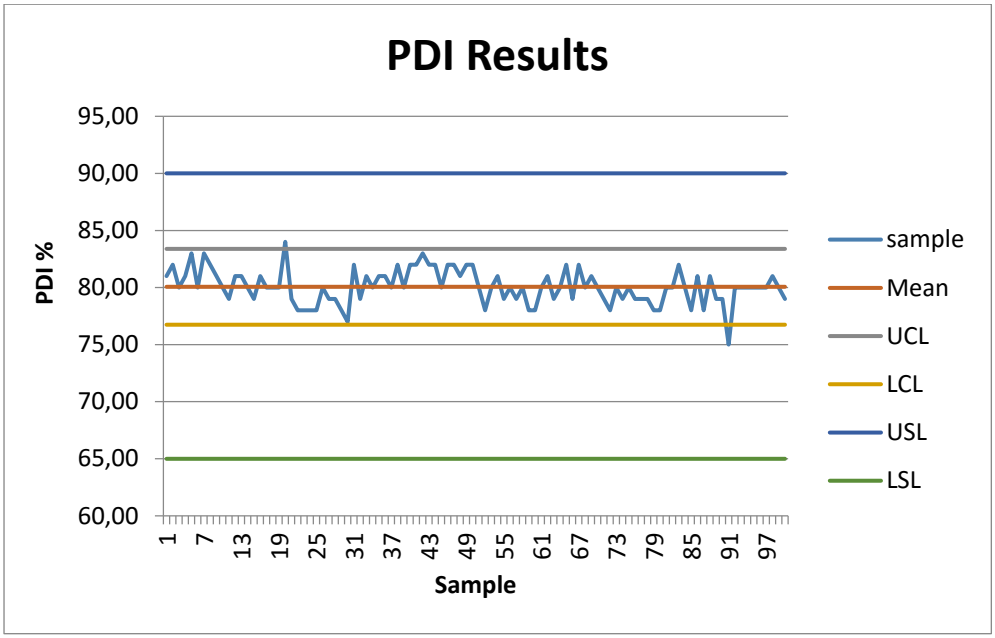


Figure 11: Histogram for the PDI results, grinding by using 3mm or 4mm sieves, moisture 12%



Lot Number

Figure 12: Control Chart for PDI%, grinding 3mm and 4mm and moisture 12% (Mean= 80.5, UCL = 83.2, LCL = 77.9)

b- Results when conditioning temperature increased to 77-80 C˚, moisture 17% as shown in table-5 and fig.13 and 15. While fig.14 for moisture 15%.
Fig-16 illustrates a comparison of PDI% for grinding by 3 mm and 4 mm with moisture 12% and 17%.

Fig-16 illustrates a comparison of PDI% for grinding by 3 mm and 4 mm with moisture 12% and 17%.

PDI % / Temperature 158-162 F˚, Moisture 17%										
	Day									
sample	1	2	3	4	5	6	7	8	9	10
1	86.00	84.00	83.00	87.00	86.00	84.00	87.00	86.00	84.00	86.00
2	85.00	85.00	82.00	86.00	87.00	87.00	86.00	85.00	85.00	88.00
3	89.00	85.00	84.00	86.00	86.00	85.00	85.00	84.00	84.00	84.00
4	88.00	86.00	83.00	86.00	86.00	87.00	84.00	83.00	85.00	86.00
5	87.00	84.00	85.00	85.00	87.00	85.00	85.00	83.00	86.00	85.00
6	87.00	85.00	83.00	86.00	86.00	84.00	85.00	83.00	84.00	86.00
7	84.00	83.00	81.00	85.00	86.00	82.00	87.00	84.00	86.00	84.00
8	87.00	83.00	84.00	85.00	87.00	86.00	86.00	84.00	86.00	85.00
9	87.00	84.00	81.00	85.00	85.00	85.00	86.00	83.00	84.00	84.00
10	86.00	87.00	84.00	84.00	85.00	84.00	85.00	84.00	84.00	85.00

Table-5: PDI% results during 10 days/ grinding by 3mm and 4mm sieves and moisture 17%

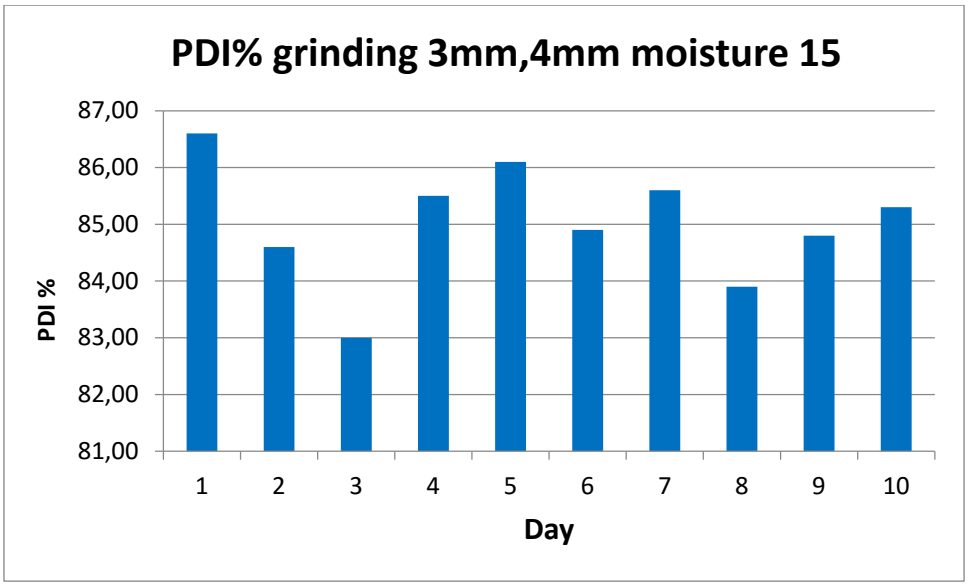


Figure 13: PDI % Values with grinding 3mm,4mm sieves, moisture 17%

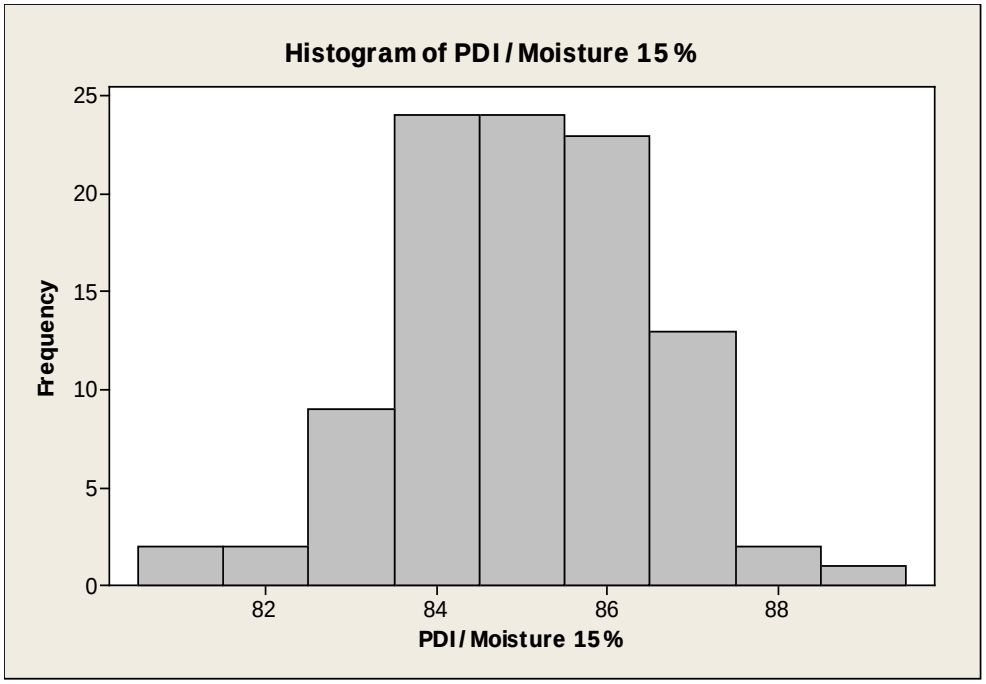


Figure 14: Histogram for the PDI results, grinding by using 3 mm or 4 mm sieves, moisture 15%

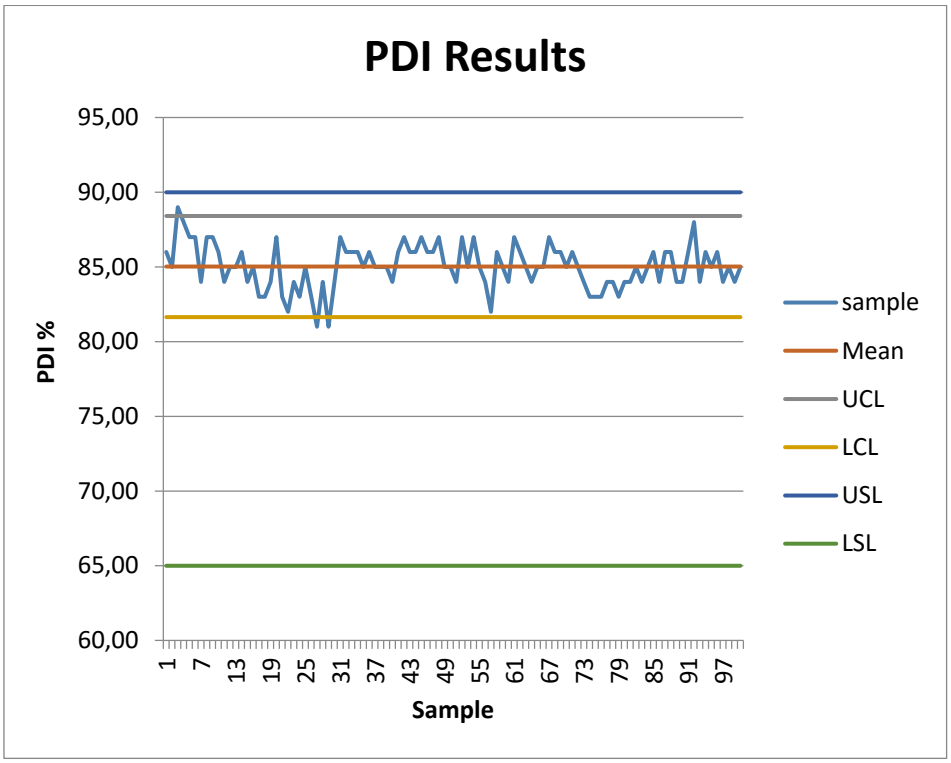


Figure 15: Control Chart for PDI%, grinding 3mm and 4mm and moisture 17% (Mean =85.49, UCL := 88.7,LCL = 82.3)

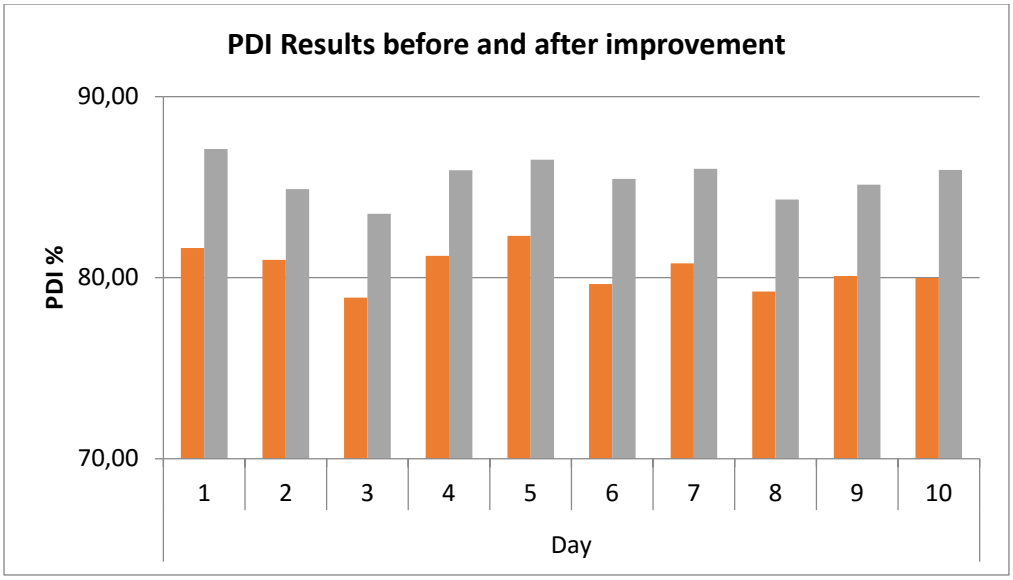


Figure 16: Improvement Chart for PDI%, after grinding by 3 mm and 4 mm , Moisture 12% and 17% (= 17%, = 12%)

A Flow Chart was established for continuous improvement in pellet process for any feed manufacturing plant as shown in fig-17.

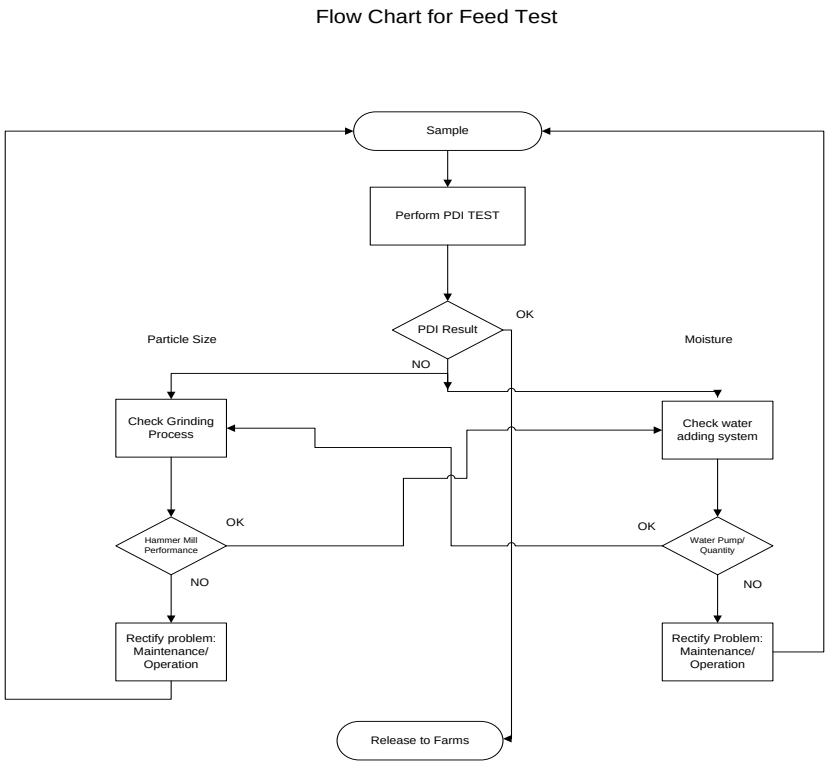


Figure -17 Flow chart for feed test.

Discussion of the Results:

The present work shows how organizations can use the basic quality tools to improve their processes and saving materials and money. A case study on a local Feed Mill Company was studied. It was shown that with the use of the basic quality tools in general, and the Statistical Process Control (SPC) tools will give a great opportunity for feed manufacturing company to monitor, control and improve their processes in order to achieve breakthrough improvements and business results. Feed producers can monitor the feed produced on a daily, weekly, or monthly basis. This would ensure that the quality of feed delivered to the customer complies with the specifications of the feed standard (ISO 9001).

It worth is to be stressed here that the control-charts in particular and the seven basic quality tools in general had demonstrated a great capacity to improvement the manufacturing and services industries across the globe and the Poultry industry in specific, which is the present work case study. There are basically five reasons behind this, which are:

- The seven basic quality tools are proven techniques for improving productivity;
- They are effective in defects and errors prevention;
- They prevent unnecessary process adjustments;
- They provide diagnostic information; and
- They provide information about process capability to meet customer requirements.

The results of the implementation of the above tools to the present work case study have shown the following improvements:

- The PDI% statistical elements due to the grinding size improvements from 4 mm and 8 sieves to 3 mm and 6 mm sieves, which are: The mean value, UCL and LCL have improved from 72.12, 74.82, and 69.42 before the improvement process(table-2 and figures- 6, 7) to 80.57, 83.35 and 77.79 after improvement process(table-4 and figures- 8, 9), respectively, with keeping the moisture unchanged (i.e. without improvements, which is below 12%). Figure-10 shows the comparison of PDI% before and after improvements. This figure illustrates that the improvement of PDI% is about 13-14 %.
- While the PDI% statistical elements due to the moisture improvements from 12% to 17% ,the elements of PDI% have improved from , mean= 80.5, UCL= 83.2 and LCL= 77.9 (table- 4 and figures-11, 12) to 85.49, 88.7 and 82.3 table-5 and figs-13 and 15 respectively. Figure-14 shows when the moisture is raised to 15%; also there is an improvement in PDI but less than moisture 17%.The results of the comparison of moisture 12% and 17% with grinding size 3mm and 4mm for both are shown in figure-16. This figure

shows clearly that the improvement is about 6-8% of PDI. This improvement is considered very valuable and profitable in feed manufacturing.

Conclusion:

From this field study results, it is clear to conclude that the well planned and updated scientific data-base for continuous training of employees from top management to technical staff, and systematic implementation of the quality tools in production processes, together with a strong commitment of leadership to continuous improvement, are the key success factors for any industry organizations to stay in business and the achievement of customer satisfaction and business excellence. It is the author's conviction that ISO 9001 certification procedure associated with the systematic implementation of the quality tools would be an excellent approach for quality improvement in the Feed industry.

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Some Comments On Fractionally Integration Processes Involving Two Agricultural *Commodities*

Lucas Renato Trevisan
Sergio Adriani David
University of São Paulo – Brazil

Abstract

This paper investigates time series of soybean and corn, which are two important Brazilian commodities. Long-range dependence or persistence is a behavior seen on times series and currently there is an increasing interest regarding the application of long memory concepts in areas such as economics and finances. A very know type of long memory model is named ARFIMA (Auto Regressive Fractionally Integrated Moving Average) which derives from the ARIMA (Auto Regressive Integrated Moving Average) model. The present work aim to analyze soybeans and corn time series to compose the spot price and forecast future prices for the aforementioned commodities. In order to test the better model for prices prediction, the ARIMA and ARFIMA models were compared. The comparison between the two models has shown that for prices forecasting, ARFIMA model has higher efficiency then ARIMA models.

Keywords: ARFIMA, ARIMA, forecast, commodities, prices

Introduction

Time series analysis can be applied to a variety range of scientific fields and can be related to different sorts of data, information or phenomenon being observed. This analysis has shown to be very useful for many problems and the effectiveness of the models depends on what it is being used for. Jaynes (1982) emphasizes that there is no conflict in between analyzes methods such as Maximum-Entropy, Bayesian, Schuster, Autoregressive models and others. The distinction among this models are the uses of it, where each one has its better field of application.

Box & Jenkins (1970) stated studies that led to the method known as ARIMA (Autoregressive Integrated Moving Average), this models as centered in the idea that time series is a natural stochastic process which can be represented by a mathematic model.

Within its concepts and applications, Autoregressive models can be

classified distinctly in some situations and can be presented as particular models, called: AR (Autoregressive) ARMA(Autoregressive and Moving Average), ARIMA (Auto Regressive Integrated Moving Average) and ARFIMA (Auto Regressive Fractionally Integrated Moving Average), as the case may be.

The applications of long memory processes were first introduced by Granger and Joyeux (1980) and later by Hosking (1981), and has become a successful tool for studies in areas such as hydrology, climatology, geophysics, economics and finances.

In this scope the agricultural commodities can be noted. According to Geman (2005), a commodity can be defined as a physical asset that presents standard features, with extensive trading in various locations, which can be transported and stored for a long period of time.

Marques et al (2006), states that the interesting of knowing future markets has increased, either applied on risks administrations, proper profits, or even to lead negotiations. Great progress has been made in understanding the links between government policy, interest rates, exchange rates, economic blocks, barriers to free trade and prices of the various commodities (agricultural, energy, gold and dollar).

In this work two Brazilian agricultural commodities are investigated, namely soybean and corn. The time series of prices for this commodities were obtained from CEPEA/USP (Center for Advanced Studies on Applied Economics/University of São Paulo). For the model development the time range for the spot price was from January 2009 to December 2013 and from January 2013 to December 2014 for the forecast process. The free software R was used to compose the ARIMA and ARFIMA model. The two models are tested to evaluate the reliability and effectiveness of the better model.

ARIMA(p,d,q) models

As a time series presents its values collected sequentially over time, it is expected to present a serial correlation in time (WERNER e RIBEIRO, 2003). This fact is reflected also as expected behavior of dependence between a current value and the previous values to this.

The models proposed by Box e Jenkins (1978) are widely known in sciences as ARIMA, which are mathematical models that intend to capture the autocorrelation behavior between the values of a time series and, once its behavior has been described, it is used to make predictions of future values in this series. If this correlation structure is well modeled, a good forecast can be provided (WERNER e RIBEIRO, 2003).

Fava (2000) presents that the ARIMA type models are the result of three distinct elements related to each other, which are the autoregressive component (AR), the moving averages component (MA), and the integration

component (I). The result from the model in may have three parts, or only a subset of them. The values for the components of the ARIMA model are formally represented in the literature by the letters *p, q* and *d*. The *p* value refers to the AR component of the model, while the parameter *q* is related to the level of MA component and finally the parameter *d* shows the number of integrations on the model.

Granger and Newbold (1986) report that most economic series shows to be non-stationary, as in general, its average and variance does not remain constant over time.

According to the work of Sartoris (2008), (y_t) follows an ARIMA (p, d, q) where the letter (I) in the middle (and also the number *d*) refers to the integration order. That is, (y_t) is integrated of order *d*, and its *d*-th difference follows a combined autoregressive process (order *p*) and moving average (order *q*).

Lima, Goes and Ulysses (2007) points out that the ADF test sets the entire differentiation level (d) of the time series model.

As the value of the parameter *m* is such that $d = 0$, the model is estimated as an ARMA (p, q), since there are no differentiation. If the series is not stationary, the difference will be applied as often as needed to acquire a stationary series, in this case, for example, *d* may assume values equal to 1 or 2 or n, and in this case the model is estimated as an ARIMA (p , d, q).

ARFIMA(p,d,q) models

According to Franco e Reisen (2007), ARIMA (p,d,q) in many cases is classified as a general process called fractional differentiation when a non-integer value for the parameter d (degree of difference) is adopted. In these cases, new way of modeling is created and which can bring great benefits to the study of various fields, such as engineering, economics, chemistry, physics, etc. These models are known as ARFIMA.

The ARFIMA models can be described as a generalization of the ARIMA model, being responsible for capture and shaping processes with long serial dependence, which are popularly called long-term memory processes (Souza et al. 2010).

Franco e Reisen (2007) has also shown that the most important feature of ARFIMA model is the long dependence also named as long memory, found to *d* values in the range of 0.0 to 0.5. Another very important feature of the model is the small outbuilding, or short memory, which infers to *d* values between -0.5 and 0.0.

Regarding to ARFIMA model, Lima, Gois and Ulysses (2007) stated that, formally, the entire differentiation assumption of ARIMA model is arbitrary. Thus it can be said that it is possible to carry out modeling a temporal series considering that *d* can assume non-integral values.

Lima, Goes and Ulysses (2007) further describes that the fractional difference parameter *d* on ARFIMA, can be estimated by semi-parametric procedure proposed by Geweke and Hudack-Porter (1983).

In addition Lima, the fractional differentiation can be performed using binomial expansion of the form proposed by Diebold and Rudebusch (1989):

Estimation, verification and prediction

To obtain an ARIMA/ARFIMA model is required to identify the value for the coefficients θ_P and φ_p. The autocorrelation function (ACF) and the partial autocorrelation function (PACF) are responsible for explicit which class of model the time series has, in other words, through the behavior of ACF and PACF functions is possible to identify the parameter AR(p) and MA(q) for the model. This functions are merely the correlation in between a present value and its past values.

The correlation between a current value Y_t in the time series Y and its previous, named $Y_{t-1,}$ is known as the autocorrelation of the series. In the same sense if the value of $Y_{t\ -1}$ correlates with its past value Y_{t-2}, it is expected that Y_t also has a correlation with $Y_{t-2.}$ The resulting correlation in between Y_t and Y_{t-1} is called frequently as lag 1, and following the same idea the correlation between Y_t and Y_{t-2} is called lag 2. Generalizing, the correlation between Y_t and Y_{t-n} is the lag n of the time series.

The relationship in between a lag n and its next lag n+1, is such that lag n+1 should be exactly the squared value of lag n. This implies that the correlation of a lag n propagates throughout the higher-order lags.

An appropriate model should behavior in a way that the residuals of ACF and PACF has no statistical significant values implying that the values of the residuals does not influence in any value of the model. Another evaluation taken to the final model refers to its Bayesian information criterion value (BIC). Another way of evaluating the efficiency of a prediction model is looking through its errors values.

Once the specific values of parameter are known, through the observation of ACF and PACF behavior, the forecast for the ARIMA and ARFIMA model can be taken and the coefficients for the models can be calculated. The results should lead to a linear equations composed by lags of dependent values and forecast error. In a general way, the process consists on prediction a desired number of ahead observations that are taken considering the past values of the time series.

ARIMA and ARFIMA prediction and comparison

The ACF and PACF plots are obtained from the original time series, and then evaluated about its stationarity. For the cases where the original

series is not stationary, the first difference is taken. After differencing, the series is analyzed again and if it is still non-stationary, the second difference is taken, and so on.

Figure 1 and 2 show the ARIMA and ARFIMA model for soybean, as well as the confidence interval for each model. A comparison between these two models is taken in order to evaluate the best option for a future prediction for each commodity. Table 1 to 3 shows the evaluation BIC values and the errors calculates to each model.

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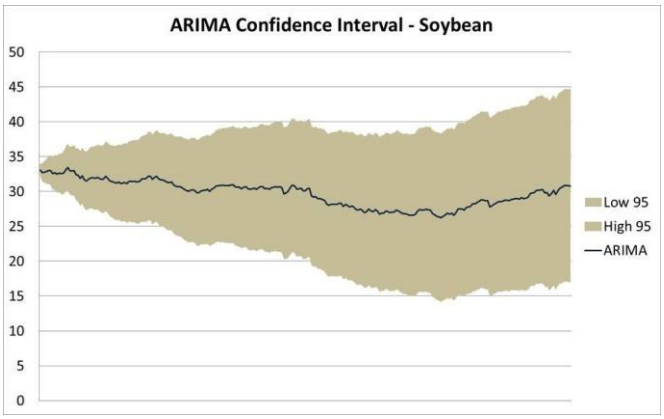

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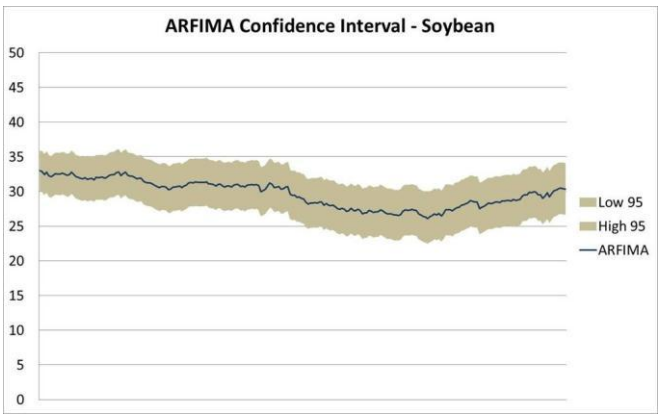

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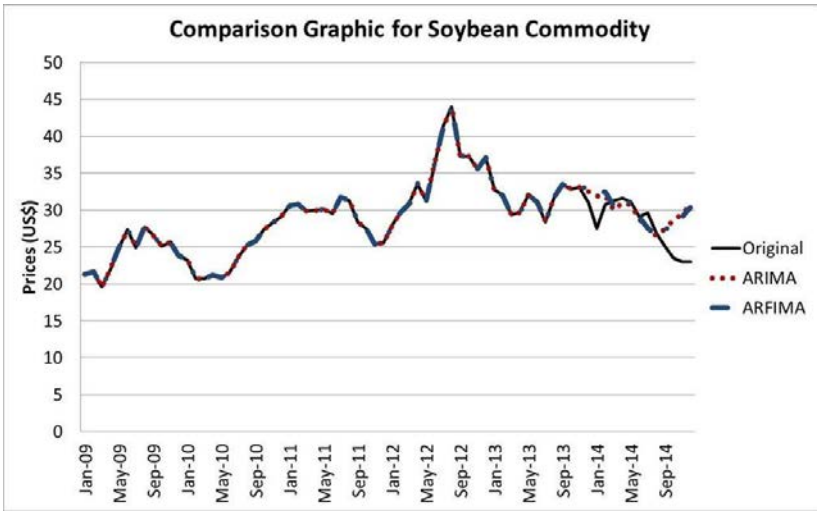
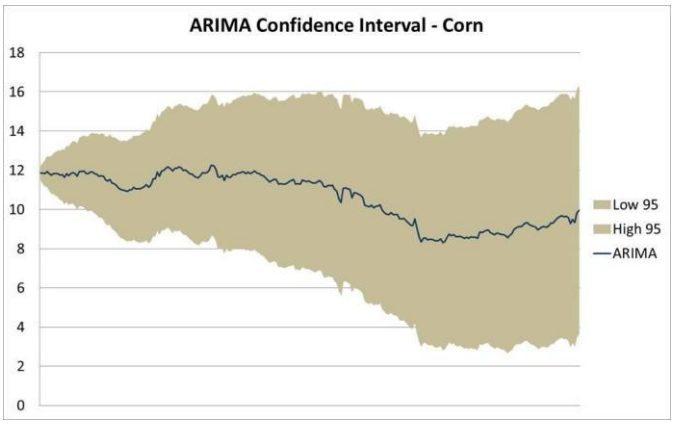


Figure 1. Soybean commodity: (a) ARIMA, (b) ARFIMA, (c) Comparison

a-



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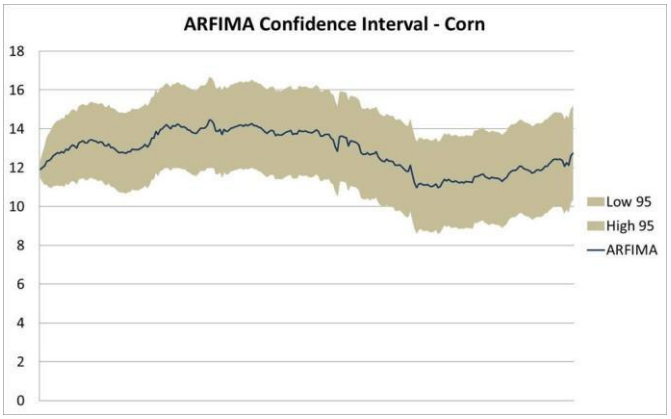

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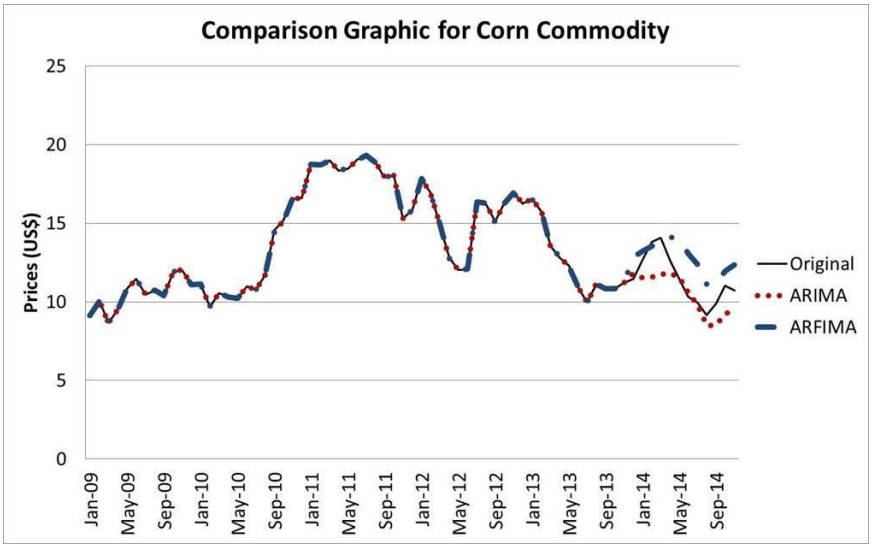

Figure 2. Soybean commodity: (a) ARIMA, (b) ARFIMA, (c) Comparison

Table 1. BIC values - ARIMA

COMMODITY	PAPER SIZE	BIC
SOYBEAN	STL+ARIMA(3,2,4)	1888,31
CORN	STL+ARIMA(2,1,0)	-1185,048

Table 2. BIC values -ARFIMA

COMMODITY	PAPER SIZE	BIC VALUES
SOYBEAN	STL+ARFIMA(0,0.5,5)	3061,716
CORN	STL+ARFIMA(0,0.5,5)	3137,638

Table3. Results and comparison of methods

Commodity	ARIMA					ARFIMA				
	(p,d, q)	E	MAE	ACF1	MASE	(p,d, q)	E	MAE	ACF1	MASE
Soybean	(3,2, 4)	8,3764	2,3525	0,9756	8,1392	(0,0.5 ,5)	8,1496	2,2859	0,9751	7,9091
Corn	(2,1, 0)	8,6800	1,1079	0,9797	9,0139	(0,0.5 ,5)	13,4429	1,6095	0,9846	13,0946

Conclusion

Fractionally integrated processes motivated an increasing interest on the application in economics and finance. One important characteristic of fractionally integrated processes is to allow more flexibility than the extreme assumption of a unit root. The real advantage of fractional models may well be in terms of representing relationships between variables and the testing of forms of fractional cointegration. In this work, the ARIMA and ARFIMA models were applied in agricultural commodities using the R software for spot price composition and future price prediction. The results show that the ARFIMA has a better performance overall for the future prices forecasting when compared with ARIMA model.

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The Resources Of Good Supervision

Kaarina Määttä*, *PhD, Prof.
Satu Uusiautti*, *PhD, Associate Prof.
University of Lapland, Finland

Abstract

A doctoral thesis is a doctoral student's huge accomplishment, but hardly can be completed without a supervisor's help and guidance. It is a common fact that a doctoral thesis requires abundant work from the doctorate, but not all are aware of that the supervision of doctoral theses presents a world filled with concerns and doubt as well as effort and successes. A supervisor's joy consists of many other feelings too: relief, when a doctoral student hands his or her newly printed doctoral thesis with beautiful binding or when the auditorium doors are closed after a successful dissertation. In order to achieve the favoring review statements, a supervisor and a doctorate have to work hard for years. What kinds of resources are needed from a supervisor's point of view? What kinds of obstacles and accelerators does a supervisor confront during the process? What makes a supervisor supervise persistently and empathetically? What are the elements of good supervision? These questions are relevant in the process of supervising doctoral theses.

Keywords: Supervision, doctoral thesis, supervisor, doctorate, PhD student

Introduction: The special features of supervising doctoral theses

The supervision of doctoral theses differs from the supervision of other theses. In this relationship, the supervisor's and doctorate's positions are special due to the high expectations and workload they are going to face. When compared to teaching, supervising is merely considered as consulting.

Yet, the supervision of doctoral theses does also include many similar roles which are adapted by a supervisor regardless of the grade of the theses he or she is supervising. A supervisor can be a guide, spokesperson, adviser, co-worker, tutor, supporter, protector, backup, referee, leader, manipulator, observer, comforter, feedback provider, critic, facilitator, planner, creator, organizer, manager, friend, and tentator. The supervision of doctoral theses is still little studied (see e.g. Mullins & Kiley, 2002), but the number of research is increasing all the time (Gardner, 2007; Knight, 2005). The

development of the supervision of doctoral theses, expectations, authority relations, the doctors' employment, the conceptions of good supervision and its problems are widely published from the doctorate's perspective both in Finland and abroad (Boud & Lee, 2009; Bolker, 1998; Booth, Clombs & Williams, 2003; Cryer, 2003; Cullen et al., 1994; Delamont, Atkinson & Parry, 2000: Dunleavy, 2003; Evans & Kamler, 2005; Golde, 2007; Murray & Moore, 2006; Philips & Pugh, 2003; Taylor & Beasley, 2005).

In this article, we will discuss the resources needed in supervision based on our earlier research and practical experience (see e.g., Määttä, 2012; Määttä, 2015; Määttä & Uusiautti, 2012; Määttä, Uusiautti, & Määttä, 2014; Uusiautti, & Määttä, 2013). What does the supervision of doctoral theses require from a supervisor? What are the key elements of good supervision?

A Good Supervisor

We have categorized the features required for supervision of doctoral theses into four resources. These resources are illustrated with the form of a cloudberry (see Figure 1). The elements of knowledge, proficiency, will, and actions are the four fundamental features of supervision—and corresponding characteristics explain the smoothness of a PhD-student's doctoral process as well. Here, the elements each form one seed of a cloudberry, and together, they constitute a whole berry, a functional supervision of doctoral theses.

As we know, the seeds of a berry are of different sizes and shapes in nature, and therefore, the cloudberries differ too. A supervisor can emphasize an element depending on his or her own style and on the doctorate's work habits and supervision needs. However, the supervision is not likely to succeed if one of the seeds, the elements of supervision, is totally missing.

First of all, will means the supervisor's commitment to the supervision. Knowledge refers to his or her substance knowledge or the mastery and ability to comprehend the overall structure. Actions are needed to ensure that the contents of research meet the scientific quality requirements. Proficiency includes positive and supportive supervision methods and the supervisor's personality.

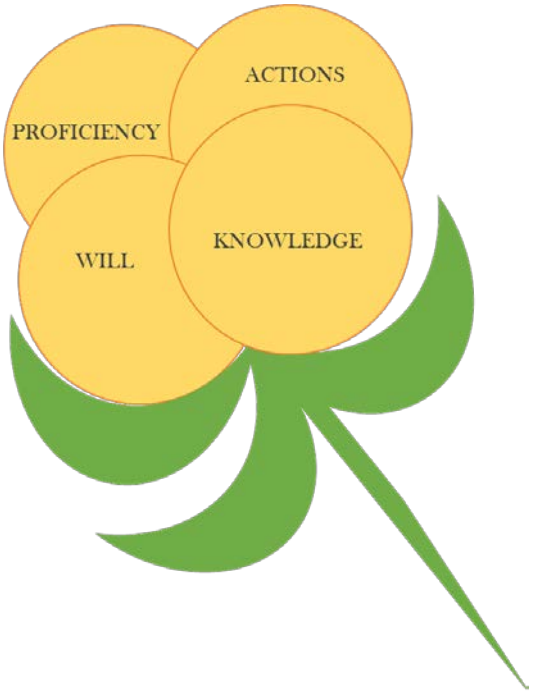

Figure 1. The elements of supervision relationship

Finishing the doctoral thesis requires the same resources from a doctoral student, too. From this point of view, will refers to the doctorate's commitment to complete the doctoral thesis and knowledge means the ability to make oneself conversant with the doctoral thesis' subject matter. Without proper actions, the thesis cannot be built according to the scientific quality requirements. The doctorate's proficiency concretely cover his or her ability to write a doctoral thesis, positive and appreciative working methods, and perseverance, persistency, and talent. By outlining the shape and area of one's own berry, every supervisor and doctoral student should recognize and assess their own resources and their possibilities to develop. The supervision relationship can be concretized if a supervisor and doctoral student compare each other's cloudberries. The berries are likely to differ from each other as do berries in nature, but if the supervisor and doctorate are ready to discuss their mutual resources, their discussion might turn into an interesting conversation that reveals the reciprocal expectations and gives a direction to the whole dissertation process. The conversation could be either informal or formal but it will form the basis to a supervision agreement between a supervisor and doctorate, which defines the rights and obligations for both of them or the basic conditions of a supervision relationship.

In this article, we will focus on the elements of supervision from the supervisor's perspective pursuing to define good supervision of doctoral theses. Next, the four elements will be introduced in detail.

Will

A dissertation process proceeds like a funnel of an hourglass. Getting started is often difficult, there are many options to choose from, and doctorates tend to feel uncertain at first. The emphases of supervision alter during the process. After having made the basic choices and definitions about the structure and contents, research work finally gets started, and the doctoral student will be able to put his or her heart into research theory, methodology, and practice with a new kind of certainty. At its best, working enthusiastic and engaged, encouraged by the supervisor.

During the research process, the supervisor will notice how the mutual relationship between a supervisor and doctoral student changes and varies. At the beginning, the relationship may include high levels of admiration and respect. However along with the process, it is not always possible to avoid disagreements. These disagreements and distress can be avoided or solved the best by being aware of the transformations in the supervision relationship during the dissertation process. The supervisor's commitment and professionalism becomes evident in not abandoning or neglecting the supervision easily—even when feeling that the value of supervision has been nullified. The more committed one is to supervision, the more satisfaction the completion of a thesis will give to the supervisor.

Along with putting his or her heart into the dissertation work, dealing with a doctoral student from phase to phase during the process, and learning to know the student, a supervisor develops into an attentive translator of a doctoral student's feelings. A committed supervisor has to deliberate constantly how to help a doctoral student discreetly with both constructive and respective tone. How to be critical but safe mirror to a doctorate who is struggling with his or her research?

As the substantial content of a doctoral thesis advances the ability to supervise and to be supervised constitutes continuous challenge. Both a supervisor and doctoral student individually and together have to constantly question the perspectives that arise. The thesis changes in the pendulum motion of constantly recurring choices, reflections, and options. The first thought of a research theme is probably already inadequate at an end of the work. The context of a completed doctoral thesis is just a glimpse of the idea from which the work started.

In the end, a doctoral student has the responsibility for the solutions and choices. What a supervisor says is not usually unquestionable but merely suggesting. Still, the supervisor's role is a very responsible one.

Knowledge

The supervisor needs not only the substance knowledge in the area of research but also knowledge of how to structure the research and organize a doctoral thesis as a whole. How to transmit this knowledge to the doctorate?

The ability to ask and suggest

It is important, that a supervisor has the ability to ask because good questions make a student realize the quintessence of the work. Furthermore, questions will be better concretized, if a supervisor is able to suggest alternatives giving a student the responsibility to make decisions.

Both a supervisor's and doctoral student's questions are important in a supervision process. The questions lead to answers, even if the answers were not the best or the most well-defined ones immediately. Already when asking a question, one gets some kind of answer or refines the questions. There are relatively abundantly source books about designing good questions and question types to help the supervisor (Klein, 1999; Koshik, 2002; Lea & Street, 2000; Martin, 2004; Vehviläinen, 2001).

The language used in supervision and the questions concerning a thesis change during a dissertation process. Thus, a supervisor may reflect and consider the nature of questions and how the questions will become more complicated during the process. What questions are the most crucial at the beginning and what kind of questions enhances the quality and advancement of the work?

The concreteness of supervision

Many times concretizing supervision and securing the dissertation process require not only verbal feedback but also written directions. Even so, a doctoral student's ability to accept or hear the feedback and a supervisor's skills to give feedback, do not always meet. Mutual misunderstandings are surprisingly common.

Despite being laborious, written feedback has its special benefits. A doctoral student can read the written advice, suggestions, and feedback in peace, is able to come back to those again and again, to reflect and dwell. However, discussing face to face and comparing notes together are invaluable. At its best, a supervising meeting ends with a following question: "What are you going to do next?" This kind of checking also guarantees the mutual understanding about the direction on which the work will proceed. It presents a way to gather up the supervision conversation and gives both to a doctoral student and a supervisor an opportunity to correct misreading.

Criticism without discouraging

Although a doctoral student knows that the evaluation is related to the scientific working, one might still be surprised by the criticism being so touching, even if it were given by the supervisor. After working at the limits, revision suggestions or demands can hurt, and one tends to defend oneself or underestimate these correction suggestions. The more concrete an evaluation is, the easier the criticism is to perceive as feedback that helps to improve the research. At its best, the corrective feedback makes one think: "why didn't I notice this at once". Surprisingly often a doctoral student had also thought of the problems that a supervisor has pointed out.

Both a supervisor and a doctoral student have to be ready to think of various new solutions in the different phases of a dissertation process. Creativity and openness to perspectives or procedures which are not ready immediately and which are changing all the time during the process. Supervising doctoral theses and studying mean constant learning and renewal as well as opening new doors. Often, the new solutions are not made until one masters the traditional and recognized basic solutions, but not just being satisfied with them.

Proficiency

Acknowledging good work

Writing a doctoral thesis is a challenging task. During the process, a doctoral student and supervisor learn to know each other as personalities with distinct characteristics and working methods. A doctoral student is willing to admit several limitations and improvement demands if he or she receives, along with criticism, also positive feedback and appreciation of the well-designed parts of thesis. It is important to realize this because the positive parts of a thesis may easily be ignored as if they were considered obvious. Yet, there is hardly ever too much positive reinforcement and acknowledgement of mastery.

In addition to the positive tone and atmosphere of the interaction, the structure of a supervision conversation should be clear. Students appreciate a professional supervisor who follows the topics through in a structured way, and interacts in a warm and emphatic manner.

It is important that also a doctoral student thinks of thanking the supervisor. If a doctoral student feels of getting help for example from comprehending comments, the time used within his or her thesis, and consultation moments or useful remarks, then the gratefulness would be good to show to a supervisor. The major reward is mutual thanking not only verbally but also in a way that they both feel of being appreciated. It does not guarantee the completion of a thesis but cherishes the special relationship between the supervisor and the doctorate.

The supervision of writing

It is important to emphasize writing when supervising a doctoral thesis. One learns to be a good writer by writing—that is the only way. And writing is the only way of reporting about one's research.

Often, an adequate advice for a doctoral student is the reassurance on how the text is always introductory at the beginning. Hardly anyone is capable of producing complete text at one sitting: the finished text results from several rewritings. If one has a fear of a white paper, one might want to try to ease it by talking about one's thoughts to oneself, recording it, and writing it down.

The phases and solutions related to the progress of the research have to be explained when writing. It is important that a supervisor takes a reader's role and estimates whether the text is understandable to outsiders. The point of the scientific writing is to prevent the text being open to various interpretations, but one should not overestimate a reader's ability to read between the lines either. After several modifications and choices, a writer might consider some things obvious and fails to write these matters. In addition, it would be important to introduce the research phases logically for a reader.

Thus, the interconnectedness of writing and thinking should not be underestimated. Brian Paltridge and Sue Starfield (2008, p. 47) remark this connection felicitously when pointing out how thinking clarifies writing (”How could I know what I am thinking before I see what I write?”) and how writing clarifies thinking (”How could I improve my writing before clarifying my thinking?”).

Practicing of writing skills never ends: one can always develop and train oneself with others' feedback. There are plentiful guides to write a doctoral thesis (e.g., Bolker, 1998; Booth, Colomb & Williams, 2003; Clark & Ivanic, 1997; Murray & Moore, 2006; Paltridge & Starfield, 2008; Vehviläinen, 2001).

Actions

A researcher might set too high a pressure for him or her. The demands and expectations set on a doctoral thesis may seem overwhelming. A supervisor might come up against mystified and unrealistic views that exaggerate the magnitude of the work.

A supervisor has a special responsibility in the supervision of doctoral theses. One has to consider the progress of a doctoral student's work in the light of the criteria set by the academic society. Sometimes, there seems to be a need to emphasize that a doctoral thesis is not made for a supervisor and a supervisor cannot bend the rules concerning the problems that might occur in a doctoral research. The quality of a doctoral thesis is not

determined by the supervisor's personal criteria, but the thesis has to meet the external criteria set by the academic society, outside the university.

A doctoral student has to be able to trust on a supervisor's opinions when assessing the quality of a thesis. Even when a thesis seems to be ready in a doctoral student's opinion, a supervisor should point out both the strengths and critical parts of the work. Being aware of the risk factors in one's work, it is likely to be easier for a doctorate to wait for the review statements and to tolerate and prepare to the corrections and changes recommended in the statements.

However, it is good to remind a doctorate of the work being never finished: there will be always something to improve. Knowing that after dissertation there will be new chances to research and write, might help making the decision about finishing the work.

The Protective and Supportive Factors

As Figure 1 showed, cloudberries have side leaves that protect and support the fruit to develop and flourish. The leaves are not drawn in the picture by accident but have a special role in the illustration of the supervision of doctoral theses. There are certain factors that shape the elements of supervision that can be seen as these protective leaves (see Figure 2).

First, *the curriculum of doctoral studies* forms the basic guidelines of what is expected from the student and to guarantee that the doctorates include all necessary studies and courses in their degrees so that they can develop as researchers. Fundamentally, the curriculum provides means to enhance will, proficiency, knowledge, and actions by offering a clear presentation of the study requirements in a doctoral degree. The curriculum is also a tool for the supervisor.

In addition, it is good to remember that the process of doctoral studies does not only consist of the supervisor and the doctorate, but happens in a wider communication with *the academic community*. Doctoral seminars held by the supervisor function as the safe and encouraging places to discuss and introduce one's research to other students. This provides a good foundation to attend conferences and seminars worldwide and to participate in scientific discourse with other researchers. At its best, the academic community enhances science by providing insightful criticism, innovative ideas and comments, and collegial support.

Finally, the university offers many kinds of support to doctoral students. *The university services* cover, for example, library services, information technology, methodological guidance etc. These form the necessary practical support that is crucial for successful study processes.

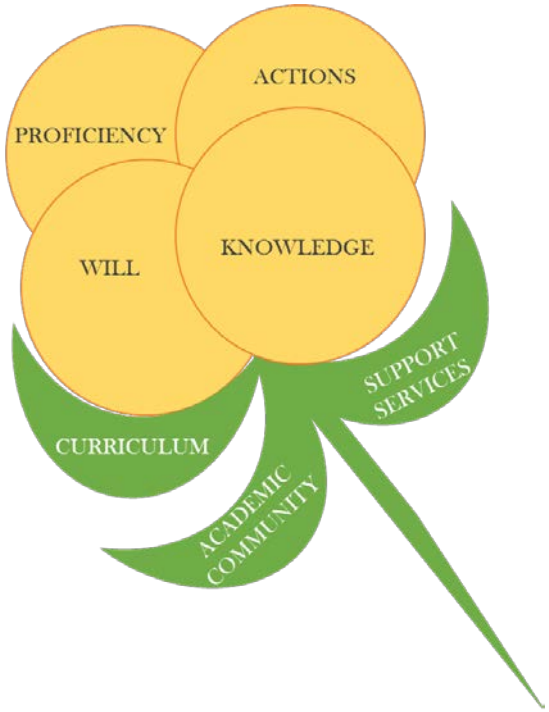

Figure 2. The supportive and protective factors of supervision

Discussion: Caring Supervision

Supervision of doctoral theses takes the supervisor to his or her limits. A supervisor's work contribution is different with every doctoral student. Although, there is not any universal and complete formula or model to supervise, many above-mentioned pedagogical principles are important. Evidently, supervision also means the supervisor's self-reflection, testing of one's limits, and being able to change even supervising methods that he or she has previously found good.

A caring supervisor has to constantly evaluate what he or she is capable of as a supervisor, how to inspire the student to toil and persevere, and to marvel their own abilities (Määttä, 2015). A committed supervisor can find the work the most satisfying and self-fulfilling when realizing the core of supervision relationship. Supervision of doctoral theses fulfills the core features of meaningful and appropriately challenging work allowing plenty of opportunities to develop personally and professionally (e.g., Flint, Kurumada, Fisher, & Zisook, 2011; Uusiautti & Määttä, 2011).

To conclude, caring supervision can help address the challenges and opportunities the work entails today and in the future. Good supervision pays attention to the supervisor's strengths and weaknesses and those of the doctorate as well. How similar are their cloudberries or how well do they complement each other? Are all the covering leaves positively present and

well employed? Certainly, supervision practices will get new forms all the time, but the core is still the interaction between the supervisor and student, without forgetting the outer factors that contribute to the supervision relationship as described in this article. The illustration introduced in this article aspires to help analyzing the supervision practices and relationships and provide supervisors with concepts to reflect on the emphases in their own way of supervising. What elements are my strong areas as a supervisor and which ones need a little development? The point is also to show that there are many ways of being a good supervisor and that various supervision relationships require different levels of will, action, knowledge, and proficiency. Self-reflection and flexibility are features that help supervisors revise their supervision practices and develop as supervisors toward holistic, caring supervision that aims at quality outcomes without risking student's or supervisor's well-being.

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Independecy Of Qualitative Audit Regarding The Audit Firm Size

Majlinda Maqellari
Drini Salko
Faculty of Ecomony and Agribusiness,
Agricultural University of Tirana (AUT), Koder – Kamez, Tirana, Albania

Abstract

During the late 1970's, regulators and small audit firms believed that the size of the audit firm did not affect audit quality. There is some criticism that the large accounting firms should not be arbitrarily distinguished from all the other Certified Public Accountants firms. De Angelo (1981) argues that consumers can use size as a measure of audit quality. This paper reports interview evidence on audit materiality and the answers to the variables regarding the size of the companies which is audited and the size of auditing company. Significant findings from the research interviews are Focus-Groups Questionnaires as a Method of Collecting Qualitative Data, in our case the group being the 215 Certified Public Accountants from Authorized Accountant Experts Institute, Albania. We want to bring out the Albanian auditor characteristic in assessing the qualitative audit, that is not depent on the size of the company who is audited or on the size of the auditing company. The result of the study can have significant implication for Authorized Accountant Experts Institute and the Quality Audit Control, which takes place once every five years for the experts on the field and for the young experts, it takes place once every two years.

Keywords: Audit quality; Risks; Professional judgment**;** Size Firms

Introduction

During the late 1970's, regulators and small audit firms believed that the size of the audit firm did not affect audit quality. There is some criticism that the large accounting firms should not be arbitrarily distinguished from all the other CPA(Certified Public Accountants) firms. De Angelo(1981) argues that consumers can use size as a measure of audit quality. De Angelo defines quality of audit services as "the market-assessed joint probability that the given auditor will both discover a breach in the client's accounting system and report the breach."

Although applying audit materiality is important in both planning and audit processes, we believed that problem is not related to the level of materiality used to plan the scope of audits. The problem comes with the application of appropriate audit judgment to the evaluation of the significance of detected misstatements.

Gray, Owen and Maunders (1991) add that professional judgement is made throughout the audit:

It begins when the [audit] firm decides to accept an appointment as auditors; and continues through the analytical review, the assessment of audit risk, the determination of levels of materiality, the areas of the company's activities on which to concentrate, the size of samples, the form of evidence to be sought, the decision to accept or not the directors' choice of accounting treatment and disclosure and culminates in the conclusions of whether or not the financial statements do show a true and fair view and whether or not to sign off a clean audit report.

Iskandar (Iskandar, T. M. 1996) states that while many professional judgements are made during the audit, the decision on 'audit materiality' is the most fundamental.

It is known about actual differences which may exist between Big 4 and non-Big 4 firms' audit processes and procedures. They argue that Big 4 and non-Big 4 audit firms fundamentally differ with respect to their investment strategies in audit technology (Sirois, L.-P., and D. A. Simunic. 2010), with Big 4 audit firms choosing to invest more in audit technology as a differentiation strategy to enhance the relative value of their audits through greater audit quality, real and/or perceived, and/or audit production efficiency gains.

However it does not show that the work of single CPA is below that of the Big, and this has been seen these last years. Financial scandals, such as Enron, WorldCom, Tyco-International, and their auditors; for example: Arthur Andersen, clearly show that big audit companies led these scandals into becoming unavoidable.

In Albania, the number of companies audited is not great. Also what characterizes our small country is that the larger the companies are, they are audited by the big audit's company, while the small auditors audit only small companies. This leads to smaller auditors' experience and familiarity with branches of the economy where they perform audits have enough impact.

Research hypotheses, data and methodology

Our study was structured upon Focus-Groups Questionnaires as a Method of Collecting Qualitative Data(Yin, R. 2011) , in our case the group being the 215 albanian CPA and having responded 132 CPA .

We have designed questionnaires regarding audit judgment based on materiality; risk assessment (professional judgment) or experience (personal judgment) they have as auditors; the years passed as auditors in a society are described as experience in auditing and size of company .

The wording of this hypothesis leads to the determination of the cause, which is the size of the company being audited, and of the effect, which is the basis of the materiality's computation.

Use of the common software previously mentioned can help at this stage (Yin, R. 2011).

Results and discussion

Multinomial execution of logistic regression through SPSS software follows a slightly different procedure from the execution of ordinary logistic regression, resulting in the reported statistics to be slightly different.

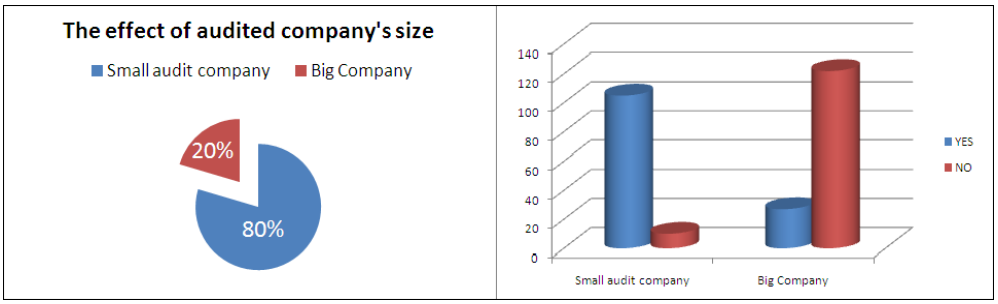

Figure 1 and 2. The effect of the size

The size of the audited company certainty 95% is an important variable to calculate the materiality because its probability is 0.038. A positive sign of the coefficient indicates that when the company being audited is great (big), then the chances increase that the accounting expert use *Calculation* as a mean of calculating the materiality rather than *Both* ways. When big variable varies from 0 to 1, the relative risk of choosing the method of calculation changes with 3.676 against *both* ways. So, in both cases this variable is important for determining materiality calculation.

Parameter Estimates

Table 1. Overview of the results of the base materiality calculation's model, product of SPSS 20

llog_matr[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
Experience	*Intercept*	-9.523	2.767	11.846	1	.001			
	pj_aud	2.319	.789	8.636	1	.003	10.165	2.165	47.726
	Age	.032	.035	.825	1	.364	1.032	.964	1.106
	Size	1.527	.865	3.116	1	.078	4.603	.845	25.076
	Gener	5.108	2.480	4.243	1	.039	165.285	1.281	21322.477
	*gener * pj_aud*	-1.859	.906	4.214	1	.040	.156	.026	.919
Calculation	*Intercept*	-2.087	1.380	2.286	1	.131			
	pj_aud	.620	.390	2.534	1	.111	1.860	.866	3.993
	Age	-.015	.029	.262	1	.609	.985	.930	1.044
	Size	1.302	.629	4.283	1	.038	3.676	1.071	12.616
	Gener	3.039	1.159	6.876	1	.009	20.890	2.155	202.537
	*gener * pj_aud*	-1.506	.544	7.663	1	.006	.222	.076	.644

a. The reference category is: *both.*

Conclusion

According to our questionnaire, the answer is that which we were afraid of the small auditors rely on the experience in the areas of economy to determine materiality. It is not negative, but the experience should be added, as well as accounting procedures and tests.

This connection is obvious, especially in CPA who work in audit firms, who by experience of these firms (Big), who use a strict protocol with regard to audit planning and the procedures for calculation of risk and materiality, make a new mentality even for the Albanian CPA, it should serve not only in IEKA's training but even in the necessity of drafting of a working file model - since most auditors are individuals - and it will help the work of every CPA to be subjected to a strict protocol according to this model file, and will increase the effectiveness of the auditor's work, giving a priority to the Calculations and Tests against Experience.

Also one thing that is noticed is that the women CPAs are a little more careful than men CPAs because they do a rotation, like experience and tests. This leads IEKA to reflect in quality control to be given a bigger place to the control at the men CPA.

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Materiality And Risk
Essential Pillars Of The Auditor's Work

Majlinda Maqellari
Ines Dika
Faculty of Ecomony and Agribusiness,
Agricultural University of Tirana (AUT), Koder – Kamez, Tirana, Albania

Abstract

This paper reports interview evidence on audit materiality and the answers to the variables regarding how the materiality of gray area (± 5% of defined materiality) determines the auditors' opinion. Focus-Groups Questionnaires is a Method of Collecting Qualitative Data, in our case, 215 Certified Public Accountants (CPA) from Authorized Accountant Experts Institute (IEKA), Albania. Opinion of the auditors about the financial statements, in cases of gray materiality´s area depends on the experience or the substantive audit procedures.

We have designed questionnaires regarding audit judgment based on the experience, gender, risk assessment, age. We have scrutinized albanian CPA giving a priority calculations and tests versus experience.

The Albanian auditor characteristic in professional judgment, is dependeble on substantive procedures, but auditors use their experience on enterprises operating in the same feld. The young experts use professional judgment more than personal judgment.

Keywords: Materiality; risk; professional judgment; substantive procedures

Introduction

The auditor is expected to design and conduct an audit that provides reasonable assurance that material misstatements will be detected. Materiality is a concept that relates to the significance or importance of an item (Lesli.D.A). Auditors and management sometimes have legitimate differences of opinion about the significance or importance of a misstatement. A misstatement is an error, either intentional or unintentional, that exists in a transaction or financial statement account balance. The auditor and management may disagree about whether a misstatement is material. A amount that may be sigificant to one person, may not be significant to another.

Despite these measurement difficulties, the concept of materiality is pervasive and guides the nature and extent of the audit opinion formulation process. Therefore, it is essential to understand materiality in the context of designing and conducting a qualitative audit. There are various definitions of materiality; we highlight several below that capture the essential elements of this concept.

In Concepts Statement No. 2, the Financial Accounting Standards Board (FASB) defines materiality as "the magnitude of an omission or misstatement of accounting information that, in light of surrounding circumstances, makes it probable that the judgment of a reasonable person relying on the information would have been changed or influenced by the omission or misstatement." ISA 320, Materiality in Planning and Performing an Audit, makes the point that auditors' judgments about materiality should be made based on a consideration of the information needs of users as an overall group.

Metodology

Materiality is considered as a key concept in the theory and practice of accounting and auditing. It is a significant factor in the planning of the audit procedures, performing the planned audit procedures, evaluating the results of the audit procedures and issuing an audit report.Cases of gray materiality´s area depend on the experience of auditors in determining the opinion on the financial statements. By the way of formulating hypothesis hints that the dependent factor is the way how the materiality of gray area (consequence) is determined and the cause must be the experience of auditor in the exercise of the profession.

As it is presented above, the concept of materiality of the grey area represents the effect, while the experience of the auditor in exercising of his profession, gender and age, as well as participation in consecutive audits are causes. This behavior can be translated as; experience, gender, age and participation in audits determine technique of materiality in the gray area.

The concept of materiality of gray area is measured by dummy variable with two attributes, where 1 is marked with experience and 0 is marked with substantive tests and tested population growth. Both these attributes are ways to measure the materiality of the gray zone. Its symbol is (matr_gri).

Experience of the auditor is measured by the number of years he has been practicing out his profession with the symbol *(pervj)*, while the age refers to years of auditor´s life with the symbol (*mosh)*. Gender is measured by a dummy variable, where 0 is female and 1is male with the symbol (*gjin)*, while participation in consecutive audits is measured with an ordinal dummy

variable, where 1 is the few option, 2 stands for some and 3 is for many, with the symbol (pj_aud).

It is asked to control the hypothesis that connects these variables in such a functional form:

$$matr\_gri = f\,(pervj, gjin, mosh, pj\_aud).$$

From earlier cases, the hypothesis is: Cases gray area materiality depends on the experience of auditors in determining the opinion on the financial statements. The shape of the equation for the model could be this:

$$P(matr\_gri_{0;1}) = \frac{1}{1+e^{-(\beta_0+\beta_1 pervj+\beta_2 gjin)}},$$

Results and Discussion

Cases of materiality of gray area depend on the experience of auditors in determining the opinion on the financial statements. To check this hypothesis, naturally raises the need of evaluating the relation of experience with cases auditors' materiality gray area through regression.

The following table provides the main results of the models estimated by the EViews8 software.

Table 1.Descriptive statistics categorized for the explanatory variables for the second model of materiality of the gray area, worked with Eviews8.

*matr_gri * pervj* Crosstabulation

Count

		Pervj										Total
		2	3	4	5	6	7	8	9	10	14	15	
matr_gri	*Substantive tests*	20	25	4	8	2	7	2	1	2	1	24	96
	Experience	0	0	2	0	0	1	2	5	1	1	24	36
	Total	20	25	6	8	2	8	4	6	3	2	48	132

Table 2. The categorical descriptive statistics for explanatory variables

Categorical Descriptive Statistics for Explanatory Variables

Variable	Mean Dep=0	Mean Dep=1	Mean All
C	1.000000	1.000000	1.000000
Exp	6.781250	12.77778	8.416667
Age	47.64583	54.05556	49.39394
Gender	0.447917	0.555556	0.477273

Variable	Standard Deviation Dep=0	Standard Deviation Dep=1	Standard Deviation All
C	0.000000	0.000000	0.000000
Exp	5.205671	3.514144	5.489812

Age	8.467870	6.645920	8.485963
Gender	0.499890	0.503953	0.501386
Observations	96	36	132

The following table reports the results of this test. Since the likelihood probability ration is almost p = 0.05, then with statistical certainty of 94% we can say that the age variable is not excessive for the second model. So, the age factor should not leave the regression. The presence of age in the model is also justified by statistical procedure.

Table 3. Test for excessive variables in the second model of materiality of the gray area, worked with Eviews8.

Redundant Variables Test
Equation: EQ02
Specification: *matr_gri c pervj mosh gjin*
Redundant Variables: *mosh*

	Value	Df	Probability
Likelihood ratio	3.595915	1	0.0579

LR test summary:

	Value	Df
Restricted LogL	-60.41745	129
Unrestricted LogL	-58.61949	128

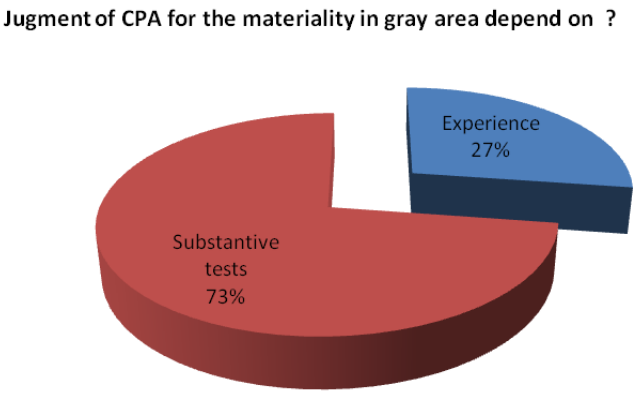
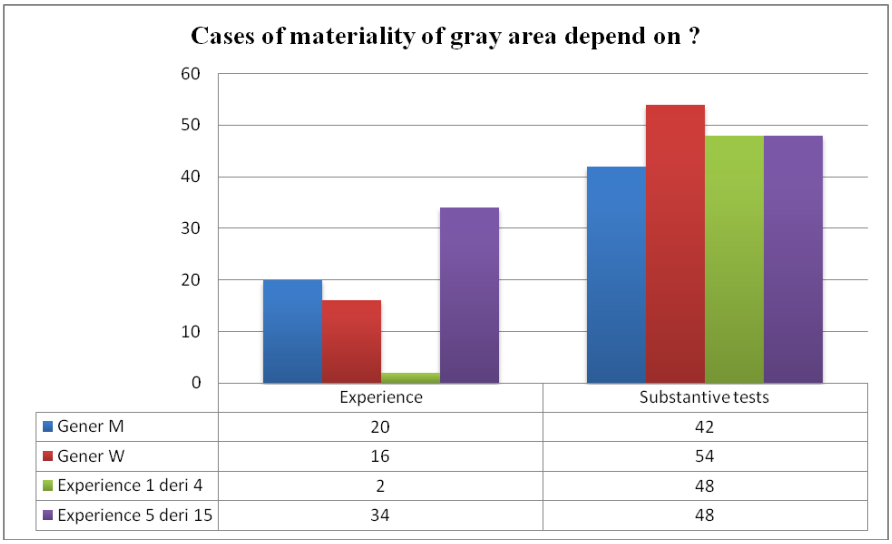


Figure 1. Trial of CPA in the gray area.



	Experience	Substantive tests
Gener M	20	42
Gener W	16	54
Experience 1 deri 4	2	48
Experience 5 deri 15	34	48

Figure 2. Distribution of calculation of materiality in the gray area by sex and experience.

By the same logic, it was controlled for missing or hidden variables for the second model. The following is illustrated the relevant test for size factor. Since the probability of the likelihood ratio statistic is greater than p = 0.05, then it is judged with the security level over 95% because size factor is not hidden for the model.

Conclusions

Our application has identified the existence of a strong correlation between the professional judgment and the substantive tests. Risks and experience are the methods that Albanian CPAs choose to determine the materiality.

CPA women are a little more careful than CPA men for choosing the substantive tests vs. experience. Young CPA choose substantive tests vs. Experience too.

The result of the study can have significant implication for IEKA and the Quality Audit Control which takes place once every five years for the experts on the field. For the young experts, it takes place only once every two years. The young experts use professional judgment more than personal judgment.

Also one thing that is noticed CPA women are a little more careful than CPA men after doing a rotation as experience and tests, this leads to reflect IEKA in quality control to be given a place with great control the CPA men. Obvious that the experts with the young and those who work in society are likely to use the tests assessed at Risk and materiality than experience.

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The Social Status Of Judo Athletes

Dragan Popovic
Ph.D., professor,Faculty of Sport and Physical Education, University of Pristina; research fields: computation statistics, computer programming, mathematical psychology, kinesiology and motor control.
Evagelia Boli
Ph.D., professor,Faculty of Sport and Physical Education, University of Pristina; research fields:sociology and kinesiology.
Milos Popovic
Assistant ,Faculty of Sport and Physical Education, University of Pristina; research fields: kinesiology
Vladimir Savic
Assistant ,Faculty of Sport and Physical Education, University of Pristina; research fields: kinesiology
Jasna Popovic
Ph.D.,doc ,Faculty of Sport and Physical Education, University of Pristina; research fields: kinesiology

Abstract

The research aimed to determine the social status structure of male and female judo athletes. In order to determine the social status structure a total of 200 athletes (100 males and 100 females) were examined.

To assess the social status, a model designed by Saksida and Petrovic as well as Appendix INST2 and questionnaire SSMIN (Boli, Popovic, Karanov & all 2015) were applied. All the data in this study were processed at the Multidisciplinary Research Center of the Faculty of Sport and Physical Education, University of Pristina, through the system of data processing software programs DRSAOFT developed by Popovic, D. (1980,1993) and Momirovic, K. & Popovic , D. (2003). The algorithm and program applied in this study are fully presented and the results of this program are analyzed. In order to determine the latent structure of social status of judo athletes, a method of component factor analysis was used. Using component analysis of variables for assessing the social status of judo athletes and applying Momirovic`s B6 criterion, three characteristic roots which can be considered statistically significant were obtained. The total percentage of the explained variability of the applied system of variables is 37.45%. By examining Table

1, it can be seen that the first characteristic root extracts 18.75% of the explained variance, the second - 10.21%, and the third only 8.45%.

Keywords: Judo athletes, social status

Introduction

Modern judo is a dynamic high intensity acyclic activity which, for achieving top results, requires a high level of anthropological dimensions, especially motor abilities accompanied by adequate tactical preparedness. Present-day judo demands that fight flow at a very rapid pace in a relatively short period of time and it abounds in various technical and tactical elements. Thus, judo athletes exhibit a very high level of coordination, speed, power (explosive, repetitive, isometric), flexibility and endurance, especially anaerobic and aerobic. The ultimate goal of combat is victory attained by throwing an opponent using some of the many techniques with dominant movements of the arms, legs, trunk or the entire body. It is reasonable to expect that an activity characterized by a large number of coordinationally very complex techniques implies a high level of intelligence, that is, a high level of cognitive abilities, as in the case of judo.

Judo is characterized by a large number of techniques and their complexity, which requires from athletes acquiring a great deal of information which enables them to perceive the essential elements of the technique to be able to predict the opponent`s intentions and react adequately.

In judo, like in other sports, based on the rich experience and coaching potential, efforts have always been made to discover factors which could contribute to achieving better results. Influence of scientific methods and multidimensional approach to sport activities have played a decisive role in athletes` health preservation and made the way towards achieving better results easier.

Success in sport, including judo, represents the resultant of many components mutually conditioned in a single activity, i.e. the sum of anthropometric, motor, cognitive, conative, functional and other factors as well as social status of athletes.

Social characteristics are characteristics of some groups or social institutions to which a person belongs or with which he or she is associated.

Within the framework of the integral anthropological status in social space, the subjects of most previous studies were related to a person`s position in a social field, or problems of social differentiation, social stratification and social mobility. While the concept of social mobility is relatively clear, the notions of social differentiation and social stratification are often confused and sometimes equated with the notion of class

differences. One of the reasons of such a state of things is certainly a lack of adequate cybernetic models on which research on social differentiation would be based.

Knowledge of social status is an important condition in the process of sport selection and development of models on the basis of which the training process is programmed.

The research methods

Sample of respondents

The research was carried out on a sample of 100 male and 100 female promising young judo athletes aged 18 to 27 years in the following clubs: JC "Stara Carsija" Kraljevo, JC "Masinac" Kraljevo, JC "Goc" Vrnjacka Banja, JC "Krusevac", JC "Kinezis" Nis, JC "Nis", JC "Shogun" Nis, JC "Makikomi" Belgrade, JC "Brus-Panikop" Brus. Owing to their ranking at the Serbian Championships, all of them were included into the list of potential representatives to participate in the European and Balkan Championships.

Proceeding from the defined problem, subject, objectives and tasks of the research and taking into consideration the organizational capabilities, an optimal number of respondents were taken to conduct the research correctly and obtain exact results.

Respondents were to meet the following requirements:

- to be on the list of potential representatives of Serbia
- to have no organic and somatic diseases
- to be 18 to 27 years of age.

Ample of social status variables

In order to assess social status, a model developed by Saksida and Petrovic as well as Appendix INST2 and questionnaire SSMIN (Popovic, Stankovic & Boli, 2012, 2014) were applied.

(1,2) What is your father`s / mother`s highest level of education? (EDUF), (EDUM)

(3,4,5) What is your / your father`s / your mother`s level of foreign language knowledge ? (FOLR), (FOLF), (FOLM)

(6) What type of secondary school do you attend? (SECSCH)

(7.8) What is your father `s / mother`s qualification recognized at his/her last workplace? (QUALF), (QUALM)

(9:10) What was your paternal / maternal grandfather`s education? (EDUPGRF), (EDUMGRF)

(11) What was the grade point average in the last year of your schooling? (GPA)

(12) What has been your sport activity to date? (SPORT)

(13, 14, 15) What was the type of place of residence where you / your father / your mother lived until 15 years of age? (PL15R), (PL15F), (PL15M)

(16) What is the type of place of residence of your family? (PLFAM)

(17,18) Are your father and mother engaged as municipal councilors or MPs? (POLITF), (POLITM)

(19) Does your family have …? (FAMHA)

(20) What is the average amount of household waste in square meters per your family member? (WASFAM)

(21) How comfortable is the apartment your family lives in? (APACOMF)

(22) What is your household`s total monthly income? (INCOME)

(23) What sport did you / your father / mother do? (SPORTR), SPORTF), (SPORTM)

Tatistical data processing

The value of a study does not only depend on the sample of respondents and sample of variables, that is, the value of basic information, but also on the applied procedures for transformation and condensation of this information. Some scientific problems can be solved with the help of a number of different, and sometimes equally valuable, methods. However, with the same basic data, different conclusions can be drawn from the results of different methods. Therefore, the problem of selection of certain data processing methods is rather complex.

In order to reach satisfactory scientific solutions, the researchers used, primarily, correct, then adequate, impartial and comparable procedures which corresponded to the nature of the stated problem and allowed extraction and transformation of the appropriate dimensions.

Taking this into account, those procedures were selected for the purpose of this study that corresponded to the nature of the problem, did not leave too large restrictions on the basic information and were based on the assumptions as follows:

- latent dimensions which are the object of measurement by means of the applied measuring instruments have multivariate normal distribution;
- relations between manifest and latent variables can be approximated by the generalized Gauss-Markov-Rao linear model.

Except for Mulaik`s well-known textbook on factor analysis which has something on estimation of reliability of principal components (Mulaik, 1972) and Kaiser and Caffrey`s study in which, based on maximizing the reliability of latent dimensions, their method of Alpha factor analysis was derived (Kaiser & Caffrey, 1965), it seems that producers of different methods of component and factor analyses as well as the authors of books on

this class of methods for latent structure analysis were not really concerned about how much the existence of the latent dimensions obtained by these methods can be trusted. This also refers to the latent dimensions obtained by orthoblique transformation of principal components, a method that has become a standard procedure for latent structure analysis among all those who did not acquire information on factor analysis reading seriously written texts from this field with their fingers or analyzed their data by means of some of the commercial statistical software packages, such as, but not limited to, SPSS, CSS, Statistica, BMDP and Statgraphics, not to mention other products whose popularity is much lower, but not always because they are significantly weaker than those almost exclusively misused today by ignorant scientists and a special sort of human beings called a strain of processors.

Though, in a paper which proposes competitive application of semiorthogonal transformation of principal components in exploratory and confirmatory analyses of latent structures, a procedure to assess reliability of latent dimensions based on Cronbach`s strategy for generalizability assessment is presented. But this procedure is as much justified as the assumptions under which Cronbach`s coefficient was derived. For unclear reasons, everybody today calls this coefficient by his name, although exactly the same measure was proposed, long before Cronbach and under virtually the same assumptions, by Spearman and Brown, Kuder and Richardson, Guttman, and described, in somewhat simplified form, by Momirovic, Wolf and Popovic (1999) and some other psychometricians who worked in a nascent stage of development of measurement theory and the time which was not affected by the computer revolution.

Therefore, the aim of this study was to propose three measures of lower limit for reliability of the latent dimensions obtained by semiorthogonal transformations of principal components. All the measures were derived within a classical model of decomposition of variance of a quantitative variable. The measures derived from some other measurement theory models will be proposed in one of the next articles. The first measure is an estimate of the absolute lower limit of reliability, and its logical basis is identical to that of Guttman`s measure . The second measure is an estimate of the lower limit of reliability of latent dimensions based on the estimate of the lower limit of reliability of the variables which have the same field of meaning, and its logical basis is identical to that of Guttman`s measure . The third measure was derived assuming that reliability coefficients of the variables under study are known; its value, therefore, depends on the value of the procedures by which these coefficients were calculated or estimated.

Semiorthogonal transformation of principal components

Let Z be a matrix of the standardized data obtained by describing a set E of n entities on a set V of m quantitative, normal or at least elliptically distributed variables. Let R be an intercorrelation matrix of these variables. Assume that matrix R is surely regular and it is possible to reject with certainty the hypothesis that variables from V have a spherical distribution, i.e. the eigenvalues of the matrix of correlations in population P from which sample E was drawn are equal. Let $U^2 = (\text{diag } R^{-1})^{-1}$ be Guttman`s estimate of unique variances of variables from V, and let λ_p, p = 1,...,m be eigenvalues of matrix R. Let c = trag ($\mathbf{I} - \mathbf{U}^2$). Define scalar k such that $\lambda_p^k \lambda_p > c$, $\lambda_p^{k-1} \lambda_p < c$. Now k is the number of principal components of matrix Z defined on the basis of Stalec and Momirovic`s PB criterion Stalec & Momirovic. Let $\Lambda = (\lambda_p)$; p = 1,...,k be a diagonal matrix of the first k eigenvalues of matrix R and let $X = (x_p)$; p = 1,...,k be a matrix of their associated eigenvectors scaled so that $X^tX = I$. Let T be an orthonormal matrix such that it optimizes the function $XT = Q = (q_p)$; p (Q) = extremum, $T^tT = I$ where p (Q) is a parsimonic function, for example, the ordinary Varimax function $\sum_j^m \sum_p^k q_{jp}^4 - \sum_p^k (\sum_j^m q_{jp}^2)^2$ = maximum where coefficients q_{jp} are elements of matrix Q (Kaiser, 1958). Now the transformation of principal components defined by vectors in matrix K = ZX into semiorthogonal latent dimensions determined by the type II orthoblique procedure (Harris & Kaiser, 1964) is defined by the operation m L = KT = ZXT. The covariance matrix of these dimensions is $C = L^tL\, n^{-1} = Q^tRQ = T^t\Lambda T$. Denote the matrix of their variances by $S^2 = (s_p^2) = \text{diag } C$. If the latent dimensions are standardized by the operation $D = LS^{-1}$, their intercorrelations will be in the matrix $M = D^tDn^{-1} = S^{-1}T^t\Lambda TS^{-1}$. Note that C and therefore M cannot be diagonal matrices and the latent dimensions obtained in this way are not orthogonal in the space of entities from E. The matrix of correlations between variables from V and latent variables, which is commonly referred to as a factor structure matrix, will be $F = Z^tDn^{-1} = RXTS^{-1} = X\Lambda TS^{-1}$; and as the elements of matrix F are orthogonal projections of vectors from Z onto vectors from D, the coordinates of these vectors in the space spanned by vectors from D are elements of the matrix $A = FM^{-1} = XTS$. But since $A^tA = S^2$, the latent dimensions obtained by this technique are orthogonal in the space spanned by the vectors of variables from Z; the squared norms of the vectors of these dimensions in the space of variables are equal to variances of the dimensions.

Estimates of reliability of latent dimensions

Due to the simplicity and clear algebraic and geometric meanings of both latent dimensions and identification structures associated with these dimensions, reliability of the latent dimensions obtained by an orthoblique

transformation of principal components can be determined in a clear and unambiguous manner.

Let $G = (g_{ij})$; $i = 1,...,n$; $j = 1,...,m$ be a permissibly unknown matrix of measurement errors in the description of the set E on the set V. Then the matrix of true results of entities from E on variables from V will be $Y = Z - G$.

If we, in accordance with the classical theory of measurement, assume that matrix G is such that $Y^tG = 0$ and $G^tGn^{-1} = E^2 = (e_{jj}^2)$ where E^2 is a diagonal matrix, the true covariance matrix will be $H = Y^tYn^{-1} = R - E^2$ if $R = Z^tZn^{-1}$ is an intercorrelation matrix of variables from V defined on the set E.

Assume that the reliability coefficients of variables from V are known; let P be a diagonal matrix whose elements ρ_j are these reliability coefficients. Then the measurement error variances for the standardized results on the variables from V will be elements of the matrix $E^2 = I - \rho$.

Now true values on the latent dimensions will be elements of the matrix $\Phi = (Z - G)Q$ with the covariance matrix $\Phi = \Phi^t\Phi n^{-1} = Q^tHQ = Q^tRQ - Q^tE^2Q = (\Phi_{pq})$. Therefore, true variances of the latent dimensions will be the diagonal elements of matrix Φ. Denote these elements by Φ_p^2. Based on the formal definition of reliability coefficients of some variable $\rho = \sigma_t^2 / \sigma^2$ where σ_t^2 is the true variance of some variable and σ^2 is the total variance of that variable, that is, the variance that also includes error variance, reliability coefficients of the latent dimensions will be $\rho_p = \Phi_p^2 / s_p^2 = 1 - (q_p^tE^2q_p)(q_p^tRq)^{-1}$ $p = 1,...,k$ if reliability coefficients of the variables from which these dimensions are derived are known.

Proposition 1

Coefficients ρ_p vary in the range (0,1) and can take the value of 1 if and only if $\rho = I$, i.e. if all the variables are measured without error, and the value of 0 if and only if $\rho = 0$ and $R = I$, i.e. if the total variance of all the variables consists only of measurement error variance and variables from V have a spherical normal distribution.

Proof:

If the total variance of each variable from a set of variables consists only of measurement error variance, then, necessarily $E^2 = I$ and $R = I$ and all the coefficients ρ_p are equal to zero. The first part of the proposition is evident from the definition of coefficients ρ_p. This means that reliability of each latent dimension, regardless of how the latent dimension is determined, equals 1if the variables from which the dimension is derived are measured without error.

However, matrix of reliability coefficients $\rho = (\rho_j)$ is often unknown, so measurement error variance matrix E^2 is also unknown. But if variables from V are selected to represent a universe of variables U with the

same field of meaning, the upper limit of measurement error variances is defined by elements of matrix U^2 (Guttman, 1945), that is, unique variances of these variables. Therefore, in this case, the lower limit of reliability of latent dimensions can be estimated by the coefficients $\square_p = 1 - (q_p^t U^2 q_p)(q_p^t R q_p)^{-1}$ p = 1,...,k which are derived using a method identical to that by which coefficients $\square_p$ are derived under the definition $E^2 = U^2$, that is, the same procedure through which Guttman derived his measure $\square_6$.

Proposition 2

Coefficients $\square_p$ vary in the range (0,1), but they cannot reach the value of 1.

Proof:

If R = I, then $U^2 = I$ and all coefficients $\square_p$ are equal to zero. But as $U^2 = 0$ is not possible if matrix R is regular, all coefficients $\square_p$ are necessarily less than 1 and tend towards 1 when the unique variance of the variables from which the latent dimensions are derived tends towards zero.

Applying the same technology, it is also easy to derive measures of the absolute lower limit of reliability of latent dimensions defined by means of this procedure in the same manner as Guttman derived his measure $\square_1$. For that purpose, let $E^2 = I$. Then $\square_p = 1 - (q_p^t R q_p)^{-1}$ will be measures of the absolute lower limit of reliability of latent dimensions as, of course, $Q^tQ = I$.

Proposition 3

All coefficients $\square_p$ are always less than 1.

Proof:

It is obvious that all coefficients $\square_p$ are necessarily less than 1 and tend towards 1 when m, the number of variables in the set V, tends to infinity because in this case, every squared form of matrix R tends to infinity. If R = I, then, obviously, all coefficients $\square_p$ are equal to zero. However, the lower value of coefficients $\square_p$ needn`t be zero because it is possible, but not for all coefficients $\square_p$, that variance s_p^2 of a latent dimension is less than 1. Of course, the latent dimension that emits less information than any variable from which it is derived has no sense, and it can perhaps be best discovered based on the values of coefficients $\square_p$. The type $\square_\square$ measures (Momirovic, 1999) defined by functions $\square_\square$ and $\square_{\square\square}$will be, for the result defined by function h, $\square_{\square\square} = \square^{\square}\square^{\square\square}\square$and $\square_{\square\square} = 1 - \square^{\square}\square^{\square\square}$. It is not difficult to show that, for regular sets of particles, the type $\square_{\square\square}$measures are estimates of the lower limit of reliability of measures of types $\square_\square$ and $\square_{\square\square}$, and that the type $\square_\square\square$measures are estimates of the upper limit of reliability of measures of types $\square_\square$ and $\square_\square\square$

All the data in this study were processed at the Multidisciplinary Research Center of the Faculty of Sport and Physical Education, University of Pristina, through a system of data processing software programs DRSTAT

developed by Popovic, D. (1980), (1993) and Momirovic, K. & Popovic , D. (2003).

Discussion

Social characteristics are characteristics of some groups or social institutions to which a person belongs or with which he or she is associated.

Within the framework of the integral anthropological status in social space, the subjects of most previous studies were related to a person`s position in a social field, or problems of social differentiation, social stratification and social mobility Hosek & Momirovic. While the concept of social mobility is relatively clear, the notions of social differentiation and social stratification are often confused and sometimes equated with the notion of class differences. One of the reasons of such a state of things is certainly a lack of adequate cybernetic models on which research on social differentiation would be based.

In previous studies, using factor techniques, several first-order social status factors were identified within some subsystems:

socialization subsystem: educational status – the level of an individual`s educational attainment in society, and basic residential status - characteristics of the place where the subject spent his or her childhood;

institutionalization subsystem: professional status - the level of an individual`s expert power or his or her position in a work organization, socio-political status - an individual`s position in socio-political organizations, political orientation;

sanction subsystem: basic-economic status – a family`s net income and household items which are standard in the family, lifestyle - above-average standard of living, and residential status – characteristics of the place where people live.

Only one social status model has been made so far which allows the true scientific approach to the study of the structure of stratification dimensions. The model was constructed by S. Saksida and later used by other scientists as a basis for their studies Saksida & Petrovic. Designed as a phenomenological model, it has undergone several changes overtime, but it has remained appropriate for the study of social changes.

The problem of social differentiation, and especially the problem of social stratification, is associated with several methodological problems of mathematical and statistical nature whose solutions have not or not adequately been found for the simple reason that these problems were not explicitly defined.

In most of the studies carried out in this country, component model-based methods have more often been used in real space than in image space. The latter has proved to be much more suitable. But the difficulties were

with the procedures for determining the number of significant image factors. The factor model has been applied very rarely, and not without reason; invariantness of solutions has always been considered an absolute advantage and influenced preference for the component model. The two methods whose logical base is highly consistent with the essence of the problem of the latent structure of stratified dimensions have rarely been used in this country. Of these, Kaiser and Gaffrey`s analysis which maximizes the reliability of isolated latent dimensions is particularly advantageous because in the exploratory phase, in which the study of stratified latent dimensions is at the moment, it is perhaps most important to determine their existence with a sufficiently high degree of credibility.

However, the component model in the Harris space has an absolute advantage and represents the optimal procedure due to its metrics invariantness and true positioning of principal axes which is in accordance with their significance in the common subspace (Harris, 1964; Mulaik, 1972).

Regardless of which method for extracting and transforming latent dimensions is used, the serious problem is whether it is possible, based on actuarial-type status variables, to attribute to latent dimensions the kind of existence attributed to them in other anthropological studies where variables are defined not only with better measurement instruments but also so as to be logically suitable for determining true dimensions. At this moment it is not quite certain whether latent stratification dimensions of only classification category are suitable, and nothing more than that.

Using component analysis of variables for assessing social status of judo athletes and applying Momirovic`s B6 criterion, three characteristic roots which can be considered statistically significant were obtained. The total percentage of the explained variability of the applied system of variables is 37.45%. By examining Table 1, it can be seen that the first characteristic root extracts 18.75% of the explained variance, the second - 10.21%, and the third only 8.45%.

The following variables have the largest projection on the first oblimin factor: respondent`s sport, grade point average, the type of place of his/her childhood, how wealthy his/her family is, etc. The distinctive feature of this oblimin factor is the variables that assess educational status which is subordinate to the socialization subsystem, and here is a lifestyle variable which belongs to the sanction or consequence subsystem. Accepting the real fact that judo athletes as entities realize different roles in different groups during their lifetime, it is becoming clear that the first oblimin factor to which the most important kinesiological reality is given represents the dominant feature of a judo athlete and can be nominated as a factor of social status. Tables 2, 3, and 4.

The second oblimin factor is defined by the variables of lifestyle, economic status, political affiliation which belong to the sanction and institutional subsystems. This latent dimension is bipolar.

The third oblimin factor is explained by the variables which assess the institutional subsystem and variable for assessing residential status, or sanction or consequence subsystem.

This space of judo athletes requires further research using new methods and new instruments for its assessment to enter a deeper and more comprehensive analysis of social status of the treated respondents.

Table 1. Matrix of principal components of social status

	FAC1	FAC2	FAC3	h^2
EDUF	.48	-.26	.23	.36
EDUM	.70	-.01	.33	.60
FOLR	.12	.28	.33	.21
FOLF	.53	-.19	.17	.35
FOLM	.53	-.12	.17	.33
SECSCH	.33	.23	.47	.39
QUALF	.35	-.43	.13	.32
QUALM	.44	-.05	.37	.33
EDUPGRF	.69	-.16	.06	.51
EDUMGRF	.70	-.13	-.02	.52
GPA	.48	-.01	.42	.41
SPORT	.33	-.04	.19	.15
PL15R	.59	.58	-.36	.83
PL15F	.62	.53	-.25	.74
PL15M	.51	.42	-.18	.48
PLFAM	.53	.49	-.35	.65
POLITF	-.14	.04	.18	.05
POLITM	-.00	.11	.08	.02
TVCOMP	.39	-.38	-.27	.38
APASQM	.19	-.48	-.35	.40
APACOMF	-.28	.16	.58	.45
INCOME	.40	-.50	-.49	.67
SPORTR	.14	.16	-.07	.05
SPORTF	-.08	.50	.09	.27
SPORTM	-.10	.36	-.18	.17
Charact.root	4.88	2.65	2.19	
%Variance	18.79	10.21	8.45	
Cumulat.%	18.79	28.95	37.45	

Table 2. Matrix of social status pattern

	OBL1	OBL2	OBL3
EDUF	.04	.06	.00
EDUM	.59	-.07	-.08
FOLR	.73	.17	.08
FOLF	.21	.09	.40
FOLM	.56	.04	-.10
SECSCH	.54	.09	-.06
QUALF	.47	.09	.43
QUALM	.48	-.20	-.24
EDUPGRF	.57	-.01	.15
EDUMGRF	.60	.19	-.21
GPA	.55	.27	-.25
SPORT	.62	.01	.20
PL15R	.38	.03	.04
PL15F	.02	.91	-.05
PL15M	.13	.82	-.00
PLFAM	.13	.66	.00
POLITF	.01	.80	-.09
POLITM	-.00	-.13	.20
TVCOMP	.01	.03	.13
APASQM	.24	.05	-.54
APACOMF	.08	-.07	-.61
INCOME	.10	-.32	.61
SPORTR	.15	.09	-.78
SPORTF	.00	.22	.00
SPORTM	-.16	.27	.40

Table 3. Matrix of social status structure

	OBL1	OBL2	OBL3
EDUF	.05	.07	.00
EDUM	.59	.02	-.15
FOLR	.75	.30	.02
FOLF	.18	.14	.38
FOLM	.58	.13	-.15
SECSCH	.56	.18	-.11
QUALF	.44	.19	.39
QUALM	.47	-.13	-.30
EDUPGRF	.56	.09	.09
EDUMGRF	.66	.29	-.26
GPA	.62	.35	-.30
SPORT	.60	.12	.14
PL15R	.38	.10	.00
PL15F	.18	.91	-.02
PL15M	.27	.85	.01
PLFAM	.24	.68	.02
POLITF	.16	.80	-.05
POLITM	-.04	-.12	.19
TVCOMP	.00	.04	.13
APASQM	.31	.07	-.56
APACOMF	.13	-.08	-.62
INCOME	-.01	-.28	.58
SPORTR	.24	.09	-.79
SPORTF	.04	.22	.01
SPORTM	-.16	.26	.43

Table 4. Oblimin factor intercorrelations

	OOBL1	OBL2	OBL3
OBL1	1.00	.17	-.10
OBL2	.17	1.00	.04
OBL3	-.10	.04	1.00

Conclusion

The research aimed to determine the social status structure of male and female judo athletes. In order to determine the social status structure a total of 200 athletes (100 males and 100 females) were examined.

To assess the social status, a model designed by Saksida and Petrovic as well as Appendix INST2 and questionnaire SSMIN (Boli, Popovic, Karanov & all 2015) were applied.

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The algorithm and program applied in this study are fully presented and the results of this program are analyzed.

In order to determine the latent structure of social status of judo athletes, a method of component factor analysis was used.

Using component analysis of variables for assessing the social status of judo athletes and applying Momirovic`s B6 criterion, three characteristic roots which can be considered statistically significant were obtained. The total percentage of the explained variability of the applied system of variables is 37.45%. By examining Table 1, it can be seen that the first characteristic root extracts 18.75% of the explained variance, the second - 10.21%, and the third only 8.45%.

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The Determinants Of Industrialization: Empirical Evidence For Africa

Beji Samouel
University of Sousse, FSEGS-MoFID, Tunisia
Belhadj Aram
University of Carthage, FSEGN-ENVIE, Tunisia
University of Orléans, LEO, France

Abstract

In this paper, we run dynamic panel model describing the relationship between industrialization and different socio-economic, financial and institutional determinants for 35 African countries over the period 1970-2012. We conduct also sub-regional and sub-period analysis in order to check the robustness of the results.

Our main results are the following: (i) As generally found in the literature, Human capital, Labor Market conditions, Real Effective Exchange Rate and GDP per capita are clear determinants of industrialization in Africa; (ii) The determinants of industrialization vary between regions in the continent and evolve over time; (iii) policy interdependencies are significant and positive for industrialization in Africa.

Keywords: Industrialization, Industrial policies, Panel Model, GMM, Africa.

1. Introduction:

It is well documented in various literatures that industrialization has several advantages, especially in the long run, such as economic diversification, unemployment reduction, technology transfer and welfare improvement. This statement seems to be reinforced after the recent economic crisis and the considerable expansion of the financial service sector that brought manufacturing back in the spotlight.

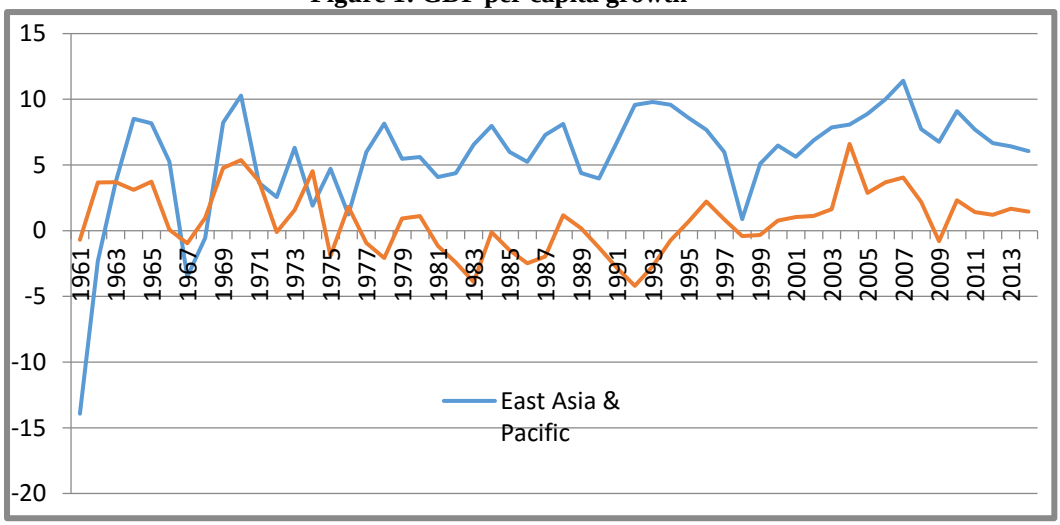
East and South East Asian countries as well as some Latin American ones have experienced remarkable growth linked notably to a switch in their industrial strategy[7]. This switching, manifested by an early mutation from

[7] These countries are called Newly Industrialized Economies (NIEs). Even that there is no commonly agreed criteria for membership to this group, the countries most frequently stated

import substituting approach to export promotion one has been accompanied by an extraordinary prosperity of the industrial sector. Indeed, as shown in figure 1, starting from the 80's, GDP per capita growth in East Asian Countries fluctuated between 6 and 10%.

However, in Africa, industrial policies were not linear, starting from import substitution strategy in the 60's, moving to a combination of the latter one with an export substitution approach in the 70' and 80' before choosing a market oriented strategy in the 90'. The results were disappointing given that the changes from one strategy to another was not translated by an economic transformation and then by an industrial take-off of the continent (Kouassi 2008). Indeed, as figure 1 illustrates, GDP per capita growth was always by far inferior from the one registered in the East Asian and Pacific Countries.

Figure 1: GDP per capita growth



Source: WDI (2014)

The connotation which considers Africa as an agriculture and mining continent remains given the inability of the governments to build up a structural transformation of their economies. Even countries that achieved macroeconomic stability and evidenced good governance seemed unable to attract much investment outside of the extractive sector.

Obviously, despite the gap of industrial performances between Africa and the other emerging countries, industrial development seems to be given less weight than deserved in African countries. Most political leaders have indeed underestimated the real potential of industrialization for the continent. At the same time, only few researchers have dealt with the reasons that lie

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are: Hong Kong, Singapore, Korea, Taiwan, Argentina, Brazil, India, China with Malaysia, Indonesia and Thailand sometimes included as well (Weiss 2002).

behind the delayed emergence of Africa as an industrialized bloc. Therefore, understanding the underdevelopment of industry in African countries and paving the way for an appropriate industrial policy to them seems challenging.

The aim of this paper is twofold. It first tries to fill the aforementioned void by emphasizing the main determinants of the (de) industrialization process in a sample of African countries. It subsequently tries to use the results to address the implications for the continent and map out the way for a genuine emergence of Africa.

The rest of the paper is structured as follows: Section 2 reviews the theoretical determinants of Industrialization and points out some findings in the literature related to these determinants in developing countries, African countries in particular. Section 3 highlights the empirical methodology. Section 4 presents the main estimation results. Section 5 tries to carry out some robustness analysis. Finally, Section 6 concludes and offers some policy recommendations.

2. Industrialization vs. De-Industrialization: the main factors

Basically, many factors could promote or hinder industrialization process. Some of them are socio-economic, others are financial while others are institutional. Though the literature is extensive in this frame, we consider here only some of the important determinants of industrialization while stating each time, the mainly empirical approach used in this frame.

Internal vs. external demand

There is a significant positive relationship between manufacturing expansion and internal demand so that, other things being equal, larger countries tend to have a higher manufacturing share. In others words, as incomes per capita raise, share of manufacturing in national income increases.

However, small countries are often open, so, level of economic activity in developed economies could have a major impact on growth prospects in developing countries, particularly through changes on export demand. Therefore, changes in formers economies' GDP could influence industrial activity in the latter ones.

Guadagno (2012), basing on Cornwall (1977) model in order to estimate a manufacturing growth equation for a sample of developing countries, shows that the size of the domestic market as well as trade openness are a constant determinants of industrialization.

Economic openness

Following outward-looking industrial strategy allow access to large markets and a growing demand which encourage a large scale industrialization programs (case of East Asian New Industrialized Economies such as Hong Kong, Singapore, Taiwan and Korea). Moreover, trade liberalization allows access to imported inputs at free trade prices, access to technology and capital as well as a more competitive exchange rate which boost industry growth. This is the case for developing countries in so much as closer integration with the world economy in the second half of the last century was associated with higher economic growth, disapproving predictions of the emergence of stagnationary global forces holding back their material progress (Weiss 2002).

In the other hand, flow of FDI, especially in manufacturing, by transferring capital, technology, management, stable financing and marketing techniques could act positively on growth and exports and then reinforce the industrialization process for the host country. Inversely, in a relatively closed or protected economy, enterprises will be both less aware of technical change internationally and will have less incentive to adopt best practice innovation. Fostering obsolete technology and high cost activities lead to low attractiveness of FDI and hamper the opening to the world markets which affects negatively the industrialization process.

Babatunde (2009), basing on a panel least squares estimation as well as time/series cross-section techniques in a large sample of Sub-Saharan Africa (SSA) find that trade liberalization can stimulate export performance albeit marginally and indirectly.

Likewise, Seetanah and Khadaroo (2007), by extending Cobb Douglas production function whereby investment is disaggregated into its different types and employing both static and dynamic panel data estimates, found that FDI is an important element in explaining economic performance in these countries, though to a lesser extent as compared to the other types of capital.

However, one cannot necessarily deduce from this evidence support for the generalization that outward-looking trade strategies and complete liberalization of FDI represent the most effective policy for all developing countries at all times[8]. State policy intervention, notably in favor of infantile industry seems to be inevitable in so much as it offers a protection from hard competition, especially during the earlier period of industrialization. In Taiwan and Korea for instances, import-substitution strategy (import quotas, tariffs, export taxes…) has not disappeared with the shift toward export intensive industries. Likewise, the state constantly intervened with

[8] See Boone (1994) for example.

inducements to encourage international capital to move up the industrial ladder (Stein 1995).

Shafeddin (2005) prove that, on the contrary to the NIEs, trade liberalization has led to de-industrialization of low income countries that has not adopt selective protection policies, particularly the Sub-Sahara African countries. Indeed, industrialization has been accompanied by increased vulnerability of the economy, particularly the manufacturing sector that relayed heavily on imports.

In the same frame, Agosin and Mayer (2000), by testing the effect of FDI on domestic investments for three developing regions (Africa, Asia and Latin America), found that this effect is various. In particular, FDI are crowding-in for Ivory Coast, Ghana and Senegal, neutral for Gabon, Kenya, Niger, Morocco and Tunisia while it is crowding-out for Central African Republic, Nigeria, Sierra Leone and Zimbabwe. So, evidently, FDI are by no means always favorable and simplistic policies for this kind of investments are unlikely to be optimal.

Macrostability

Generally, a stability of the macro environment encourages growth given that it leads firms to act in a rational manner. That's because, in a context of low inflation, suitable deficit and public debt, more risk-averse investment behavior is limited and access to financial and capital markets is less difficult. This is especially important in African countries where there may be a dearth of entrepreneurship[9].

In the other hand, maintaining stable exchange rates prove to be important insofar as it affects long run growth. Indeed, avoiding exchange rate misalignments could protect exporters from an overvaluation phenomenon that affects competitiveness as well as importers from undervaluation that affects purchases and investment programs. Moreover, exchange rate volatility makes difficult and expensive for developing countries to hedge their exchange rate risks, especially small and medium sized firms.

Rodrik (2008), by using both inflation and terms of trade as additional exogenous covariates in a panel model explaining economic growth in manufacturing, finds a negative and significant relationship between growth and inflation in developing countries.

In the same way, Greenwald and Stiglitz (2006) prove that, in developing countries, low exchange rates help export sectors like manufacturing to compete, especially sectors which have higher learning elasticities and generate more learning externalities. That's way many

[9] See Reinhart and Rogoff (2003) for more details.

countries have managed to lower their real exchange rate for an extended period of time, and have done so at the same time that they have promoted growth.

Human capital

Human capital development in the form of sufficient technically and scientifically qualified personnel allows coping with the increase of demands and industrial development. Indeed, creating immobile national assets, notably through education, training and healthcare spending could provide the base for competitive industrial sector and improve the attractiveness of investments. Therefore, increasing government support to education, improving vocational training and guaranteeing access to healthcare are prerequisites for any form of industrialization.

Zelleke et al. (2013), by using growth accounting approach to identify the sources of economic growth and by resorting to Pritchett (2001) and Weil (2013) conceptual frameworks, show that human capital have positive effects in SSA countries (they account for 22% of real GDP) but much lower than in high-income countries.

Governance

The presence of institutions capable of guaranteeing better rule enforcement, transparency, absence of corruption and government stability could improve doing business climate and stimulate entrepreneurial spirit. On the contrary, the existence of significant governance deficiencies could render difficult the building up of a solid industrial sector and complicate the leading of appropriate industrial policy[10].

In the other hand, government interventions in an inconvenient way could create distortions and lead to economic inefficiency. Maintaining rigid rules, such as considerable labor market regulation for example, could hinder the well-functioning of the markets and deter industrialization efforts.

Clague et al (1997), using a cross-country regression model, prove that differences across countries in property relations and contract enforcement lead to high transaction costs and thus have a negative impact on growth.

Similarly, by employing a structural regression model similar to that used by Sachs and Warner (1998) for analyzing the sources of economic growth in Africa, Ng and Yeats (1999) found that governance regulations (plus national trade) explain over 60 percent of the variance in some

[10] For deep analysis, see among others Collier (2000), Curry and Weiss (2000) and Williamson (2000).

measures of economic performance and thus, country's own national policies shape its rate of development, industrialization, and growth.

Financial development

The presence of financial institutions insuring better allocation of resources could affect the industrialization process. In particular, existence of efficient banking system insuring careful financing to firms, notably small and medium sized firms, reinforce domestic entrepreneurship capabilities[11].

Much attention could also be given to the functioning of financial markets and the ability of firms to obtain adequate financing. Generally, a well-developed system of financial institutions could transfer efficiently funds from savers to investors and monitor the effectiveness of investments.

Ghirmay (2004) for instance, provide evidence of the existence of a long-run relationship between financial development and economic growth in almost all (12 out of 13) of SSA countries using a Vector autoregression (VAR) framework based on the theory of cointegration and error-correction representation of cointegrated variables.

3. Empirical Methodology:

Basic Objective

In this paper, we try to verify if the aforementioned determinants matter for the industrialization process in Africa. To do that, we run panel model for 35 African countries[12] over the period 1970-2012, describing the relationship between an industrialization index and different regressors which include a variety of socio-economic indicators (GDP per capita, importance of foreign direct inflows, degree of openness to trade, financial deepening and human capital development) as well as institutional ones (magnitude of labor market rigidity and good governance).

In addition, given that the aforementioned indicators can interact with each other, we add some combined terms in order to capture this interaction. In particular, we consider here that the effect of financial development on industrialization could be influenced by the institutional environment (interaction between financial development and governance). Likewise, the

[11] See among others Liedholm and Mead (1999).

[12] Our sample contains: Algeria, Angola, Botswana, Burkina Faso, Cameroon, Congo Republic, Congo Democratic Republic, Côte d'Ivoire, Egypt, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea Bissau, Kenya, Liberia, Libya, Malawi, Mali, Morocco, Mozambique, Namibia, Niger, Nigeria, Senegal, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Tunisia, Uganda, Zambia and Zimbabwe.

effect of trade openness (imports and exports) on industry could be influenced by the degree of development of financial systems (interaction between trade openness and financial development).

Therefore, we estimate a model of the form:

$$\begin{aligned} INDUSTRY_{it} &= \gamma_0 + \gamma_1\, INDUSTRY_{it\text{-}1} + \gamma_2\, FIN_{it} + \gamma_3\, FDI_{it} + \gamma_4\, LAMRIG_{it} \\ &+ \gamma_5\, GOV_{it} + \gamma_6\, REER_{it} + \gamma_7\, GDP_{it} + \gamma_8\, TRADE_{it} + \gamma_9\, HUMAN_{it} \\ &+ \gamma_{10}\, GOV \times FIN_{it} + \gamma_{11} FIN \times TRADE_{it}\; U_{it} \end{aligned} \quad (1)$$

$$\text{With: } U_{it} = \mu_i + \varepsilon_t + \nu_{it} \quad \text{where } \nu_{it} \to N(0, \sigma_\nu^2) \text{ (i.i.d)}$$

Baltagi et al. (2009) stipulate that the inclusion of the lagged dependent variable in the empirical model implies that there is correlation between the regressors and the error term since lagged INDUSTRY depends on U_{it-1} which is a function of the μ_i, the country specific effect. Because of this correlation, dynamic panel data estimation of (1) suffers from the Nickell (1981) bias, which disappears only if T tends to infinity. The preferred estimator in this case is GMM suggested by Arellano and Bond (1991), which basically differences the model to get rid of country specific effects or any time-invariant country specific variable[13].

For a better use of the GMM system method, Roodman (2006) suggests the introduction of time dummies variables. Moreover, for the endogenous variables, only their lagged values of at least 2 periods are considered as valid instruments. The number of instruments should not exceed the number of groups, so, the p-value of the Sargan test of overidentifying restrictions as well as the Arellano-Bond test for serial correlation in the second-differenced errors should be above 0.1[14].

Other authors instrument endogenous variables with fewer lags because, they consider that, if all the lags are used, the number of instruments surpasses the number of groups and this makes Sargan test weak and estimations unreliable.

In equation (1) the coefficients γ_1, γ_2, γ_3, γ_4, γ_5, γ_6, γ_7, γ_8, γ_9, γ_{10} and γ_{11} measure the long-run response of INDUSTRY respectively to changes in INDUSTRY lagged variable by one period, financial system development (FIN), foreign direct investment net inflows as share of GDP (FDI), labor market rigidity (LAMRIG), governance index (GOV), real effective exchange rate (REER), GDP per capita (current$) (GDP), trade

[13] An additional advantage of the GMM estimator is the following: by differencing, it helps ensuring the stationnarity of all the regressors.

[14] Sargan test indicates whether the instruments are jointly valid, i.e. if they are not correlated with the error term. So, if these tests are weakened, it is hard to gauge the validity of the instrumental estimation.

openness (TRADE), human capital indicator (HUMAN), interactive term between financial development and governance (GOV*FIN) and interactive term between financial development and trade openness (FIN*TRADE). The instrumental variables for the linear model in (1) are FIN{1}, FDI{1}, LAMRIG{1}, GOV{1}, REER{1}, HUMAN{1}, GOVFIN{1}, FINTRADE {1}, GDP{2} and TRADE{2} where {1} and {2} denote the lag-length of a variable. GDP and TRADE were instrumented by 2 lags variables since they are considered as endogenous. In panel data, regressors in other periods are considered valid instruments for period-t regressors if the latter are either endogenous or introduced in the model as lags of the dependent variable. These instruments permit consistent estimation even if the assumption of strict exogeneity fails[15].

Definition of variables and Data

The variables used in our regression are the following:

INDUSTRY: Industry value added as share of GDP. It comprises value added in mining, manufacturing, construction, electricity, water and gas. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources.

FIN: Financial development indicator approximated by the share of domestic credits provided by the financial sector. It includes all credit to various sectors on a gross basis, with the exception of credit to the central government, which is net. The financial sector includes monetary authorities and deposit money banks as well as other financial corporations. Examples of other financial corporations are finance and leasing companies, money lenders, insurance corporations, pension funds and foreign exchange companies.

FDI: Foreign Direct Investment in net inflows as share of GDP. Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) from foreign investors, and is divided by GDP.

LAMRIG: Labor Market Rigidity Index. This index captures the rigidity of employment protection legislation. LAMRIG is high when the labor market is rigid and vice versa.

[15] Hossain and Mitra (2013): "A Dynamic Panel Analysis of the Determinants of FDI in Africa", *Economics Bulletin*, 33(2), p. 1608.

GOV: Governance index which measures the political and institutional development. We calculate it by applying principle component analysis for 12 other sub-indicators: Government Stability, Socioeconomic Conditions, Investment Profile, Internal Conflict, External Conflict, Corruption, Military in Politics, Religious Tensions, Law and Order, Ethnic Tensions, Democratic Accountability and Bureaucracy Quality.

However, the problem with the construction of the institutions quality indicator stems from the heterogeneous scale of the sub-indicators. Indeed, Corruption, Law and Order, Military in Politics, Religious Tensions, Ethnic Tensions and Democratic Accountability are scaled between 0-6, whereas Government Stability, Socioeconomic Conditions, Investment Profile, Internal Conflict and External Conflict are scaled between 0-12 and Bureaucratic Quality between 0-4. Therefore, we unified all the proxies to obtain an indicator scaled between 0-6. To do that, we multiplied the proxies scaled between 0-4 by 3/2 and divided by 2 those scaled between 0-12.

REER: Real effective exchange rate. It measures the development of the real value of a country's currency against the basket of its trading partners. It is calculated from the nominal effective exchange rate and the relative CPI (Consumer Price Index) between the country and its trading partners.

GDP: GDP per capita in current dollar is a proxy for the economic development. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.

TRADE: Trade openness indicator which is the sum of exports and imports as a share of GDP. But, we decompose here this variable into two sub-indicators in order to verify if industrialization process is more determined by imports or exports.

HUMAN: Human capital indicator is the gross secondary school enrollment ratio. It is the share of number of actual students enrolled at secondary school by number of potential students enrolled.

The variables INDUSTRY, FIN, FDI, GDP, TRADE (Exports and Imports) and HUMAN are subtracted from the World Development Indicators database (2014). REER variable is extracted from the International Financial Statistics database (2014). GOV indicator is constructed basing on the International Country Risk Group database (2014). Finally, LAMRIG is deduced from the work of Campos and Nugent (2012)[16].

[16] Campos, N.F and Nugent, J.B (2012) 'The Dynamics of the Regulation of Labor in Developing and Developed Countries since 1960' IZA DP N°6881.

Ramsey Reset Specification Test

Before running up our model estimation, we started by testing the specification of our equation with the Ramsey Reset specification test. The aim of this test is to check whether the model estimated is well-specified or mis-specified. The procedure of the Ramsey Reset test takes place in three steps:

a. Estimating the equation and retrieving the predicted value of the dependent variable;
b. Estimating the structural equation by adding the squared, the cubed and power 4 predicted dependent variable to the covariates (explanatory variables);
c. Applying the Fisher test to check the global significance of the three additional variables.

The result of this test is reported below (Table 2) and shows that our model is well specified.

4. Empirical results:

Before moving to empirical results, we show first some main descriptive statistics for all the model variables.

Table 1. Summary Statistics (1970-2012)

Variables	Observations	Mean	Standard Deviation	Min	Max
INDUSTRY	1313	28.49	14.43	1.88	78.51
Lagged INDUSTRY	1290	28.44	14.46	1.88	78.51
FINANCE	1302	33.36	35.7	-79.09	319.53
FDI	1296	2.72	7.65	-82.89	91
HUMAN	1086	27.35	21.75	1.05	112.62
LAMRIG	1016	1.48	0.37	0.6	2.45
GOVERNANCE	863	2.78	0.77	0.38	5.04
TEER	536	170.11	222.2	37.97	3579.12
GDP	1402	1047.24	1570.85	62.93	15853.46
TRADE					
Exports	1375	29.83	16.64	2.52	91.51
Imports	1372	35.07	15.24	2.98	144.72

As shown in table 1, the majority of our regressors show evidence of important volatility except the institutional ones (Governance and Labor market regulation). It is an expected result since these variables vary very little in time. The standard deviation of GDP is very large which attests the heterogeneity of our sample.

Secondly, following Baltagi et al. (2003), Jacob and Osang (2007) and Szirmai and Verspagen (2011), we separately inspected each single explanatory variable of the panel model adopted by means of endogeneity tests (not reported here) in order to identify which variables are endogenous.

Tests showed that Trade Openness variables and GDP per capita are both endogenous.

Table 2. Empirical Results

Variables	Coefficients	
L.INDUSTRY	(-)	0.56 (0)***
FINANCE	(+)	0.09 (0.15)
FDI	(+) or (-)	-0.05 (0.44)
HUMAN	(+)	0.13 (0)***
LAMRIG	(-)	-14.32 (0)***
GOVERNANCE	(+)	-0.27 (0.68)
REER	(-)	-0.003 (0.04)**
GDP	(+)	0.001 (0)***
EXPORTS	(+)	0.16 (0)***
IMPORTS	(+) or (-)	-0.13 (0)**
GOVERNANCE*FINANCE	(+)	0.02 (0)***
FINANCE*TRADE	(+)	0.001 (0)***
Intercept		35.51 (0)***
AR(2)		1.16 (0.24)
Sargan Test		230.85 (0.13)
Ramsey Rest Test		0.62 (0.66)

Figures in parentheses are robust standard errors, except for Sargan test and Autocorrelation errors test of Arellano-Bond (AR2) which are p-value. For AR(2), Sargan test and Ramsey Reset test, null hypotheses is respectively absence of second order autocorrelation, validity of lagged variables as instruments and right specification of the model. ***, ** and * denote significant at 1%, 5% and 10%, respectively.

According to Table 2, it is visible that, for the sample taken as a whole, Human capital indicator (HUMAN), Labor Market Rigidity (LAMRIG), Real Effective Exchange Rate (REER), GDP per capita (GDP) and Exports are clear determinants of industrialization. However, Financial development and FDI are not significant. A possible explanation for the first variable is the absence of a well-developed financial system threshold that

allows an efficient transfer of funds from savers to investors and a better monitoring of investments effectiveness. For the second variable, it probably means the failure in pursuing convenient industrialization openness strategies. Most FDI are then oriented toward based-resources sectors instead of manufactured ones.

Table 2 shows also that the interaction term grouping Finance and Trade (FINTRADE) is positive and significant which reflects the importance of policy interdependencies that are likely to play an important role in Africa. In particular, even if financial development seems to exert no effect on industry when taken as single determinant, the interaction between Financial development and Trade is beneficial for industrial development in Africa. In other words, openness to trade affects industrialization process when resources allocation is guaranteed by efficient banking and financial systems[17].

Similarly, even if governance seems to exert no effect on industry when taken as single determinant, the interaction between Financial development and governance is beneficial for industrialization process in Africa. Put differently, institutional environment seems to play an important role in shaping the effect of financial development on industrialization in the continent.

5. Robustness Analysis:

We conduct here sub-regional and sub-periods analysis in order to check the robustness of the results. We first divided the sample into 5 sub-samples: North Africa (Algeria, Egypt, Libye, Morocco and Tunisia), West Africa (Burkina Faso, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, Togo), Central Africa (Cameroon, Congo Dem Rep, Congo Rep, Gabon), East Africa (Ethiopia, Kenya, Sudan, Uganda) and South Africa (Angola, Botswana, Mozambique, Malawi, Namibia, Tanzania, South Africa, Zambia and Zimbabwe). This division is linked to the heterogeneity of the African economies. We next subdivided the time span into 2 sub-periods: 1970-1990 and 1991-2012. This subdivision is linked to the fact that, since the 1990's, almost all African countries have moved from an inward oriented industrial strategy to an outward oriented ones.

[17] The results do not change even if we divide Trade into imports and exports.

Sub-regional analysis

Table 3a. Empirical Results

	North Africa		**South Africa**	
L.INDUSTRY	(-)	0.38 (0)***	(-)	1.12 (0)***
FINANCE	(+)	0.74 (0)***	(+)	0.96 (0)***
FDI	(+) or (-)	0.27 (0.36)	(+) or (-)	2.21 (0)***
HUMAN	(+)	0,15 (0.78)	(+)	0.21 (0.21)
LAMRIG	(-)	-15.82 (0)***	(-)	8.1 (0.2)
GOVERNANCE	(+)	5.07 (0.05)**	(+)	2.21 (0)***
REER	(-)	-0.02 (0)***	(-)	0.07 (0.05)**
GDP	(+)	-0.001 (0.536)	(+)	-0,007 (0.22)
EXPORTS		0.75 (0)***		0.11 (0.567)
IMPORTS		0.09 (0.57)		0.45 (0)***
GOVERNANCE*FINANCE	(+)	0.14 (0)***	(+)	0.1 (0.02)**
FINANCE*TRADE	(+)	-0.002 (0.2)	(+)	0.02 (0.02)**
Intercept		-4.5 (0.72)		
AR(2)		0.3 (0.76)		0.39 (0.54)
Sargan Test		54.95 (0.17)		46.89 (0.23)

Figures in parentheses are robust standard errors, except for Sargan test and autocorrelation errors test of Arellano-Bond (AR2) which are p-value. For AR(2) and Sargan test, null hypotheses is respectively absence of second order autocorrelation and validity of lagged variables as instruments. ***, ** and * denote significant at 1%, 5% and 10%, respectively.

	East Africa		Central Africa		West Africa	
L.INDUSTRY	(-)	0.51 (0)***	(-)	-0.47 (0.02)**	(-)	0.67 (0)***
FINANCE	(+)	0.62 (0)***	(+)	-2.48 (0.03)**	(+)	0.38 (0.08)*
FDI	(+) or (-)	-0.51 (0.53)	(+) or (-)	0.21 (0.19)	(+) or (-)	-0.02 (0.82)
HUMAN	(+)	0.27 (0)***	(+)	0.62 (0)***	(+)	0.11 (0.08)*
LAMRIG	(-)	dropped	(-)	dropped	(-)	-6.69 (0.01)***
GOVERNANCE	(+)	-4.6 (0)***	(+)	2.42 (0.15)	(+)	-5.84 (0)***
REER		-0.05 (0)***	(-)	-0.05 (0.17)	(-)	-0.08 (0.07)*
GDP	(+)	0.02 (0)***	(+)	0.02 (0)***	(+)	0.01 (0)***
EXPORTS		0.19 (0)***		0.06 (0.79)		0.35 (0)***
IMPORTS		0.35 (0)***		0.08 (0.72)		-0.2 (0)***
GOVFIN	(+)	0.34 (0)***	(+)	0.34* (0.09)	(+)	-0.01 (0.47)
FINTRADE	(+)	0.01 (0)***	(+)	0.01 (0.03)**	(+)	-0.05 (0.13)
Intercept		-0.76 (0)***				18.56 (0.01)***
AR(2)		2.19 (0.16)		-0.34 (0.27)		0.28 (0.14)
Sargan Test		22.01 (0.12)		18.42 (0.33)		21.11 (0.13)

Figures in parentheses are robust standard errors, except for Sargan test and autocorrelation errors test of Arellano-Bond (AR2) which are p-value. For AR(2) and Sargan test, null hypotheses is respectively absence of second order autocorrelation and validity of lagged variables as instruments. ***, ** and * denote significant at 1%, 5% and 10%, respectively.

Basing on the above-mentioned results, we prove that the determinants of industrialization in Africa vary between regions. Indeed, Table 3a shows that financial development, governance, labor market conditions, REER and trade openness (exports rather than imports) are the most determining factors of industrialization in North African Countries. However, financial development, human capital and GDP matter much more for the Western and Eastern African Countries while FDI is the most important determinant in the Southern African Countries next to REER, financial development and governance.

We also notice that the complementarities between financial development and governance are active to boost industrialization in the

entire continent except in Western and Central Africa. Regarding the link between trade openness and industrialization, the results show that only in Southern and Central Africa, exports do not have a significant effect while imports do for the Southern countries. Finally, only in Eastern, Central and Southern African Countries, financial development interplays with trade while financial development interacts significantly with governance except in West Africa.

These results can reflect:

- The flexibility introduced on the labor and exchange markets, the signature of many free trade agreements as well as the several institutional reforms introduced in some North African countries (especially Tunisia, Egypt and at less extent Morocco).
- The efforts in promoting education and vocational training to raise the economy in Western and Eastern African Countries.
- The institutional reforms, the infrastructural efforts, the development of innovation patterns as well the targeting of more capital intensive FDI in Southern African countries.
- The success in boosting economic growth in central African Countries.

Table 3a shows also that governance is significant for Western and Eastern African Countries but with unexpected sign. A plausible explanation has been already introduced by Campos et al. (2010) and Méon and Weill (2011) who consider that corruption, for example, facilitates economic activity and trade that may not have happened otherwise and then promotes efficiency by allowing private sector agents to circumvent cumbersome regulations and restrictions.

Subperiod analysis

Table 3c. Empirical Results

	1970-1990		**1991-2012**	
	Coefficients		**Coefficients**	
L.INDUSTRY	(-)	0.99 (0)***	(-)	0.72 (0)***
FINANCE	(+)	-0.05 (0.54)	(+)	-0.09 (0.23)
FDI		-0.05 (0.48)		-0,03 (0.83)
HUMAN	(+)	-0.03 (0.55)	(+)	0.07 (0.01)***
LAMRIG	(-)	-2.37 (0.08)*	(-)	-3.82 (0)***
GOVERNANCE	(+)	2.43 (0.21)	(+)	0.45 (0.57)
REER	(-)	-0,004 (0.17)	(-)	-0.01 (0.07)*

GDP	(+)	0.001 (0.7)	(+)	0.002 (0.45)
EXPORTS		0.07 (0.15)		0.3 (0)***
IMPORTS		-0.04 (0.22)		-0.27 (0)***
GOVERNANCE*FINANCE	(+)	0.03 (0.18)	(+)	0.01 (0.07)*
FINANCE*TRADE	(+)	0 (0.85)	(+)	0.001 (0.05)**
Intercept		12.94 (0.02)**		15.87 (0)***
AR(2)		1.12 (0.26)		0.85 (0.39)
Sargan Test		63.14 (0.11)		96.22 (0.14)

Figures in parentheses are robust standard errors, except for Sargan test and autocorrelation errors test of Arellano-Bond (AR2) which are p-value. For AR(2) and Sargan test, null hypotheses is respectively absence of second order autocorrelation and validity of lagged variables as instruments. ***, ** and * denote significant at 1%, 5% and 10%, respectively.

Results on Table 3b prove that only LAMRIG is clear determinant of industrialization during the whole period 1970-2012. However, HUMAN becomes significant over the period 1991-2012. The latter result is probably related to the efforts taken during the last few years on the field of education, training, healthcare and technology as well as to the demographic evolution in the continent.

What is also worth noting is that exports and imports become significant in explaining the dynamics of industrialization in Africa only after 1990. This is probably due to the transition from inward looking strategy to outward looking ones.

Finally, policy interdependencies become clear determinant of industrialization from the beginning of the 1990's. In fact, the interaction term between trade and financial development as well as between financial development and institutional quality acts positively on industrialization during the period 1991-2012 and not before.

6. Conclusion and some policy implications:

In Africa, the industrial landscape continues to be poor. This gives the problematic of industrialization a very important interest. In fact, globalization and deep integration offers African countries considerable potential for future growth via industrialization.

This paper sheds some light on the main factors that helped or hindered the realization of such potential and the way for Africa to emerge. Thus, we run first a dynamic panel model describing the relationship

between industry and their main determinants found in the literature. We find that for the whole region, Human capital, Labor Market conditions, Real Effective Exchange Rate and GDP per capita are clear determinants of industrialization. However, we find positive effects of exports and negative effects of imports on industrial development. Finally, we find policy interdependencies significant and positive for industrialization in Africa.

It goes without saying that things have to be changed, especially given the low capacity of the industrial sector to upgrade and to offer enough jobs in Africa. Put it differently, to increase hopes for an effective industrialization and so for a real emergence of the continent, African countries should break up with old policies. This means essentially better mobilizing resources, improving business environment, building sound macroeconomic stability, insuring good governance and enhancing human capital to attract the adequate foreign direct investment from abroad (not just targeting the FDI based on the low wages in developing countries) which is an intermediate goal to achieve industrialization. This also means switching from bad financial and trade policies, building more efficient financial systems and better managing trade openness.

Secondly, we conduct sub regional analysis and we find that financial development, governance, labor market conditions, REER and exports are the most determining factors of industrialization in North African Countries. However, financial development, human capital and GDP matter much more for the Western and Eastern African Countries while FDI is the most important determinant in the Southern African Countries next to REER, financial development and governance.

We also notice that the complementarities between financial development and governance are active to boost industrialization in the entire continent except in Western and Central Africa. However, only in Eastern, Central and Southern African Countries, financial development interplays with trade while financial development interacts significantly with governance except in West Africa

Therefore, it is important to improve labor market flexibility and instigate good governance in Northern African Countries, reinforce the resilience of the financial systems in Eastern African countries, maintain macroeconomic stability and further enhance human capital in Western African countries, boost trade integration in Central African countries and finally encourage and better target FDI in Southern African countries.

Thirdly, we subdivided the time span into 2 sub-periods (1970-1990 and 1991-2012) and we find that the results obtained from the second period (1991-2012) do not differ substantially from those obtained during the whole period. Indeed, Human capital, Labor Market conditions, Real Effective Exchange Rate, trade variables as well as policy interdependencies

(interaction terms) are significant. Only labor market index is significant during the whole period.

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