

APPLIED THEORY OF COMPLEXITY: THE CASE OF HUMAN FACTOR IN THE CONTAINER TERMINAL OF THE PORT OF PIRAEUS

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Abstract

This paper begins with a historical introduction to the organizational model that ports in general have adopted. Here also we talk about complexity theory as applied to organizations that want to obtain a *competitive advantage* with elements from complexity theory of leadership. We then dealt with the structure of the deregulated Port of Piraeus (early 1999), where the traditional mechanistic model due to Taylor has been identified. Our field investigation concerning a survey of the human factor, carried out with the use of a questionnaire in the international container terminal of Ikionion in 2001. We then proceeded to criticize the port of Piraeus model being a state mechanistic deregulated monopoly, with consequences on effectiveness of the port such as: low productivity, long delays, and neglect of human factor completely as well as failure to deliver qualitative services in what is required: i.e. in port terminology «a fast turnaround time». A second field investigation was carried out at the same container terminal to assess quality, comparing two investigations carried out in 1994 and 1999. Then proposals for remedial action have been provided in the fifth section based on complexity theory of organizing, managing and leading companies. Special emphasis has been paid on production breakdowns and quality. The last section is a general exposition of the new theory of complexity and chaos, helpful we believe for those that encounter for the first time the new concepts contained here in. JEL Classifications: J24, J28, J53, J81, J82, L53, L89 Ports, M12, M53.

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1. Historical introduction

1.1 Introductory

We can recognize first that a basic target of any management in a simple typical structure is to reconcile two basic principles: the *division of labour* or work-encountered vividly for the first time in Adam Smith -and the concentration of

authority or *lack of delegation* (Taylor F.W., 1990; Fayol H., 1990; Weber M., 1990; Morgan, G., 1986; Robbins S.P., 1990, p. 34-37).

Ports were no exception to the above trend and so characteristics of the *classical management theories* can be too found in the Port Industry since the beginning of the 20th century. One may say that since the beginning of the Second World War, Ports adopted the «mass production of services» philosophy following the Ford's company model. And this was dominant up and including mid 1980's. The model of Ford as this is known (Robbins S.P, 1990, p. 17 & after) is based on the so called scientific management due to Taylor, but one may distinguish two important characteristics: (a) the continuous line of Port production and (b) the formalization (Robbins S.P, 1990, p. 6). This was so as these characteristics permitted to the specialized terminals of the port, the mass production leading to economies of scale. The division of a port into terminals may be seen as an effort of ports to create departments and achieve specializations.

But, mechanistic approaches due originally to Newtonian philosophy, will not produce results that will interact effectively with the new cosmology and even approaches like the newest management methodologies will not work if they are forced into structures based on mechanistic thinking (McMaster, 1996, p. 156; Battram A., 1996, p. 20 and after). Ports like any other firms are designed as mentioned from Newtonian images of the universe by separating things into parts; here influence occurs as a direct result of force exerted from one person to another; engagement in complex planning for a world that we keep expecting to be predictable and we search continually for better methods of objectively measuring and perceiving the world (Wheatley M J., 1999, p.7).

Main developments that took place after mid-1980 in ports and in the area of the gradual intensity of capital in port production caused the port manual worker to become seriously un-productive. As elsewhere, also in ports, the introduction of new technologies accelerated the adoption of new organizational structures: more decentralized- matching structure with technology- but also with different demand requirements for labour. As we have witnessed, the adoption of new technologies in ports reduced the demand for port labour, increased the requirements for specialized knowledge and therefore demanded a flexible management.

1.2 The relationship

But more importantly, the **relationship** must increase due to the demands of technology and possibility of the Information Age, as indeed this is the founda-

tion of Human Intelligence (McMaster, 1996, p. 166)! The post-Ford model (Amin A., 1994) that may be seen in ports must include a flexible specialization, which means specialized units of production, decentralized management, information technology and multiform labour. Despite the above, the better metaphor is not the universe of the 17th century, but how the universe organizes (Wheatley M.J., 1999, p. 8) itself.

1.3 The competition

Competition is another factor that must be taken into account. And this factor is a dominating one in the last fifteen years in the Port Industry. In effect the inter-port competition is considered today as a basic determining factor for the production of *qualitative* port services. Indeed, in many, but not all, ports today the total quality management/TQM (and ISO 9000) is adopted with a view to the best possible satisfaction of the user and at the same time mobilization of the whole human capital for the organization at least cost.

1.4 Total quality management versus total safety management

But our point is that ports always in delay for new methods and falling behind technological innovations in ships, have to look for Total Safety Management instead (Goulielmos, 2001) of the total quality management. The common theme here with TQM however is that it ends up being a bureaucratic burden (McMaster M D., 1996, p. 129) without a development of understanding the process.

1.5 Motivation of labour

Another management issue is *motivation* of labour in ports. Here can be asked certain questions like: what is the prime motive of the human economic behaviour? Is it a valid motive to maximize individual benefit? Or, more important motive is the personal creativity? How a system can be organized to be effective, flexible and creative? Let us see the above issues in our case study in next section.

2. The Port of Piraeus

2.1 Introduction

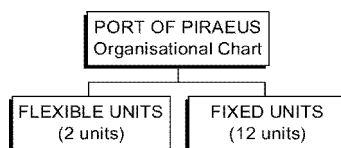
The Port of Piraeus is one of the largest in the Mediterranean and the biggest container terminal in Greece. It provides a variety of services offered by the four different port terminal stations: *passenger station, conventional cargoes, box (container) terminal and repair zone.*

2.2 Piraeus Port organizational structure

The port has in 1999 been re-formed into a Public Company from a State-owned organization as a public utility¹. The new organizational chart is shown below (Figure 1). The Board of Directors consists of 9 members. The Managing Director manages the port. The Managing Director is in charge of the various departments, he (she) directs port's works and he (she) takes the required decisions for port's functions. The port has a Managing Council, which consists of the Managing Director and the Departmental Managers/or General Directors.

FIGURE 1

The Main Distinction of the Structure of Port of Piraeus, 1999



Source: Goulielmos 2004.

Figure 1 presents the main distinctions of the new organizational structure of the PP. Certain of port's departments adopt a variable number of staff size depending on work load. These are: the *Legal Service* and *Special Consultants* termed by us as flexible units. These units have variable hierarchical levels-staff size, and look to recruit qualified staff. This perhaps was a way to counteract the public sector mentality, where staff is not recruited by qualifications but by political beliefs (see below for more details).

The fixed or inflexible port units-which here are 12-have a specific organizational structure and level and number of persons. The latter belonging to certain public servants ranking, specialty and branch. These units are characterized more by the nature of their activities, but anything else. This dual organizational face of the port, we believe, may soon become uniform as the culture of the 12 departments will destroy the culture of the *few* flexible departments we reckon, given also their variable size. Thus productivity will be reduced in the flexible sector and will be equalized with that in the other sector. These fixed units are obvious the departments used to be in the past before deregulation early in 1999.

A more effective structure could be to have *fewer* units, *flexible*, beyond a minimum required staff size related to an average demand. But here of course we have to deal with state life employment where no-body can ever be fired.

2.3 Hierarchical Levels

The port's hierarchy is in the classical line chain of command from top to bottom, extended in *four layers* as shown in figure 2 below. As shown, the hierarchical levels increased from those that existed before 1999 by the inclusion of the layer of senior management. Therefore the complexity of the structure increased too instead of been decreased for faster decisions.

FIGURE 2

The four layers of hierarchical levels at the PP, 1999



Source: Goulielmos 2004.

3. Ikonion container terminal-ICT of the Port of Piraeus.

A case-study.

3.1 Introduction

We will next study the container Terminal of PP at Ikonion. This Terminal is very important as 65% of PP revenue comes from this. As this is a relatively new construction, we can indirectly study the impact of the new technologies adopted here.

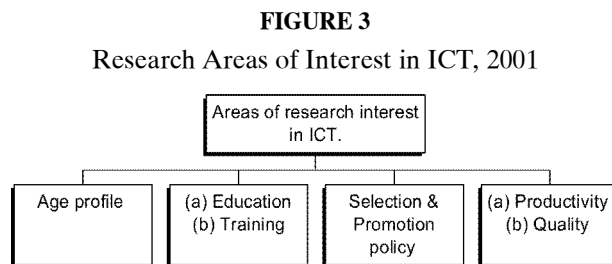
Also we can mention the intensive use of capital, which is evident here too. The people working here are 813, which is 39% of the 2065 total. The split between office and port workers is 57% (463 permanent employees) and 43% (dock labour) respectively. This *administration* emphasis of course does not help the terminal to provide effective services coupled with the permanent tenure of the staff.

3.2 The Research Method

We have used the research method of questionnaires after selecting a representative sample concerning roughly the 20% of those working in the ICT. The sample has been extracted from the relevant population, which is the total work force as registered in the port yearbook. We took into account the basic separation between dock labour and the remaining labour, the representation of sexes in this and seniority (years of service). We then determined a basic question that had to be asked in relation to work force. We distributed the questionnaire to those employed by the port using either the system «leave and go» or «door-to-door» in two stages: firstly, the questionnaire was given for study, and secondly, a visit was paid for its in site filling up and collection. The final stage was to work out the replies using such statistical tools like frequency distributions and correlations between certain variables with the least squares method.

3.3 Research Findings (for age, seniority, education, training)

The areas of the research interest of this paper are shown in figure 3 below.



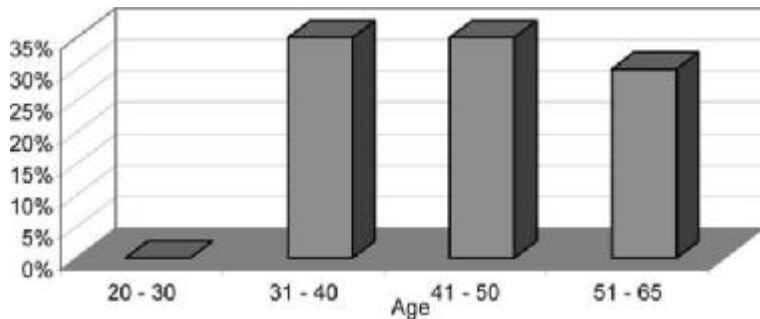
Source: Goulielmos, 2004.

The alerting finding comes from the age profile of the staff where the 65% falls in the age group *above* 41 years of age (ages 41 to 65) (figure 4). As far as the dock labour is concerned the situation is worse as 41.2% are too old (51-65 years). So the labour force is aged.

The seniority criterion indicates that about 28% (21-30 years) of the staff works more than 21 years and 81% (53.1% between 11-20 years) works for more than 11 years.

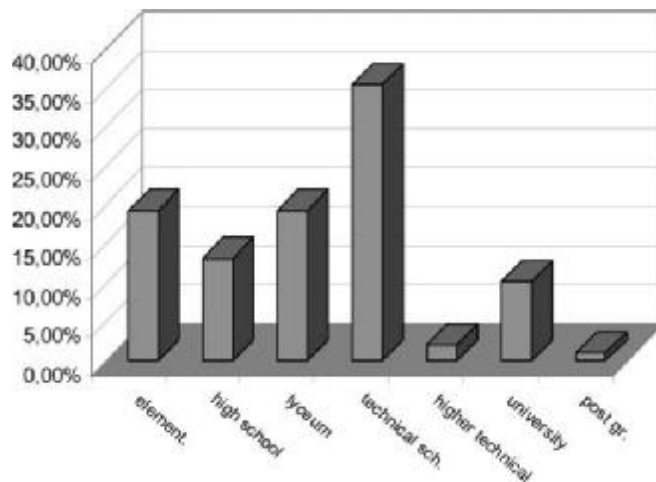
In education things are even worse as only 1% has a postgraduate degree and only 10% had a university degree. The graduates of technical schools although they cover 35.4%, their level is considered low (figure 5). Dock labour has three times (50%) more people, from elementary school. So, the labour force is not properly educated.

FIGURE 4
Age profile of work force, ICT, 2001



Source: Pardali A, 2003.

FIGURE 5
The educational profile of staff of ICT, 2001

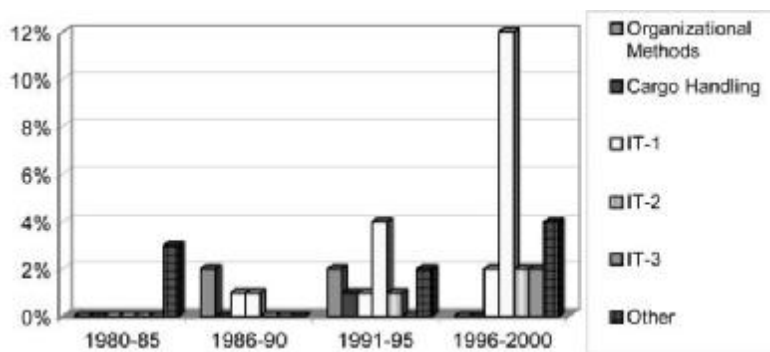


Source: Pardali A, 2003.

Given the educational profile as analyzed above, one would expect extensive training efforts coming from at least this factor. However, the 72.2% replied that has *never attended* a seminar or training. The 25.8 replied affirmative (figure 6).

As shown in the above figure No 6, the training effort has been quite limited for the last 20 years, increasing only the last 5 years. Even this training had as a target the 12% of the staff and dealt with only the basics of computers.

FIGURE 6
Staff Participation in Training, ICT, 2001



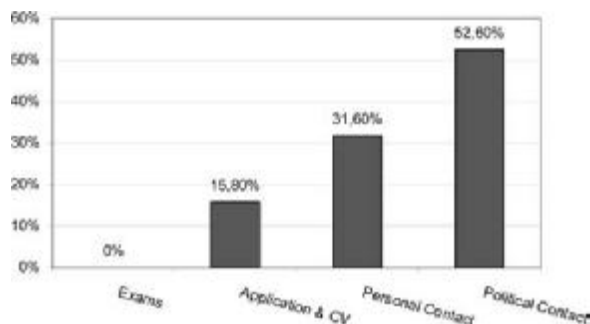
Source: Pardali A, 2001.

Index: I T- 1: basics. IT-2: software for costing, pricing, statistics.
IT-3: specialized programs for terminals.

3.4 Further Research Findings (methods of staff selection, promotion policy)

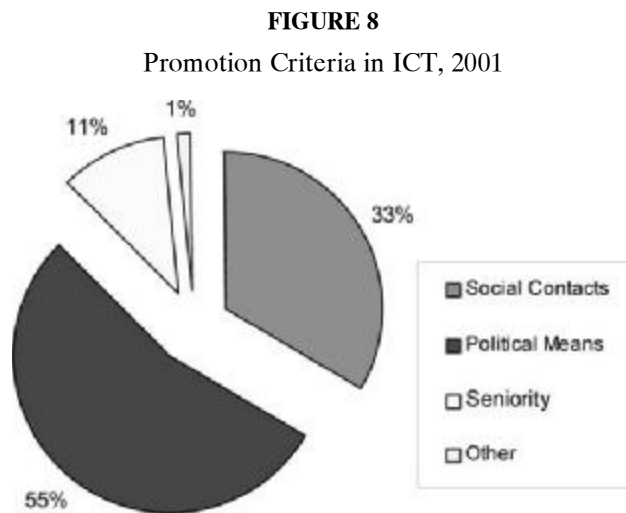
The most alerting fact is that more than 84% of the staff has been recruited on the basis of some kind of connection (either political: 53% or personal: 32%). The rest has been employed on the basis of CV following an application. None has been recruited through some kind of examination (figure 7). Dock labour situation is the same, but to a percentage of 85% (for who you know).

FIGURE 7
Recruitment ways of staff in ICT, 2001



Source: Pardali A, 2003.

The basis of the promotion policy of the ICT has been defined by the respondents as being «who you know» (88%) in society or in politics, and it does not follow any objective requirements of skill or merit (78%). The seniority criterion concerns 11% (figure 8) of staff.



Source: Pardali A, 2003.

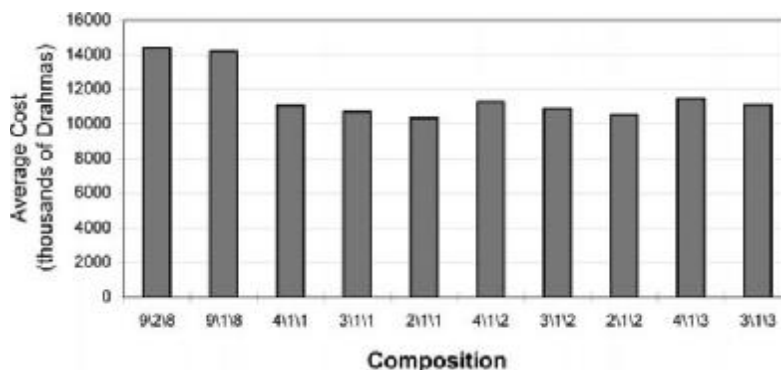
3.5 Strategy in dock labour allocation

Important is also to see that dock labour is allocated in what we called a «Greek-Marxian» fashion, where numbers are reduced physically due to technology, e.g. in unloading boxes, but no one is excluded from the pay roll! So, here Marx is right and workers satisfied. For each bridge crane 9 men are engaged in accordance with port regulation, while 3 men are more than enough... and actually working (Pardali A, 2001) (figure 9).

This situation may be unique as all organisations try to reduce cost and not to preserve a steady and increasing income to dock labour! The figure 9 indicates what is charged per unloading team, as team size changes. The box cost varies from €41 to €29. A 30% reduction in unit cost or average cost, if team size changes from 9 to 3 men. The formal numbering of persons 9/2/8 is the present situation (the first bar in figure 9; where 9 is the dock labour men, 2 are the supervisors and 8 are the operators).

FIGURE 9

Cost per box determined by the size of the dock labour team
(1€ about 341 drachmas).



Source: Pardali A, 2003.

4. The impact of the mechanistic model of management on ICT

4.1 Introduction

Our analysis so far has described the situation of an organisational model with strong marks of a state mechanistic monopoly with a capacity to provide votes to Governments through an offer of an employment. One fortunate fact is that high % of the permanent staff and the dock labour is already old, and thus new young staff can be employed on merit, provided also that the requirements of recruitment change.

The *neglect of staff training* as shown means neglect of the human dimension. And it is here that reengineering as remedy method has failed as paid no attention to the human or living part of organisational life (Hammer, 1995; Wheatley, 1999, p.29 and after).

4.2 The own criteria of promotion

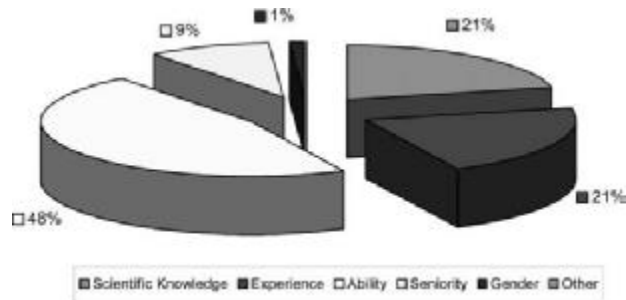
As far as the question of what should be considered as the appropriate criteria for promotion, the respondents (Pardali A, 2003) replied: skill (47%), experience (21%) and scientific knowledge (21%) (Figure 10).

This indicates the strong disagreement of reality where the ruling criteria as shown were different of what staff really wanted! This complexity theory find-

ing can be stated in a new sentence: «we slowly become who we said we wanted to be» (Wheatley, 1999, p. 130) as most basic human dynamics are completely ignored (p. 164).

FIGURE 10

Appropriate criteria for promotion stated by staff



Source: Pardali A, 2003.

4.3 Other Features

The most assuring finding is that almost all replied that they have found interesting their job (99%). Less (64%) found their salary adequate and more important –for complexity theory– is that at least half (50%) consider their *relationship* with other colleagues and supervisors as satisfactory. But, what about the other half? Here some work must be done soon. In effect we have not yet learned how to be together (Wheatley, 1999, p. 164) as we are disengaged by individualism, competition and the mechanistic worldview.

4.4 Productivity

A so crucial factor, not only can surely be increased in ports by forming teams, but also in all units. Greeks that dislike teams (except in basketball world competition in 2006) are fortunate in this instance as teams are required/ imposed by technology in dock labour in unloading container carriers (Gantry cranes).

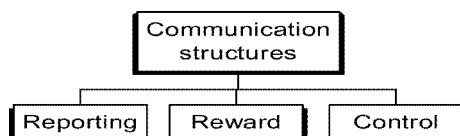
But this is not enough if structural changes are not made (McMaster, 1996, p. 158) indicated below in figure 11 referring to an *actual example* in a manufacturing company.

Information acquired passes appropriately to team accountability via public and visual displays and more people gain access for independent participation

and in their own unique ways. In linguistic changes team=individual. But which level of productivity we have here in our case study? We will see next.

FIGURE 11

Structural changes to support Team work

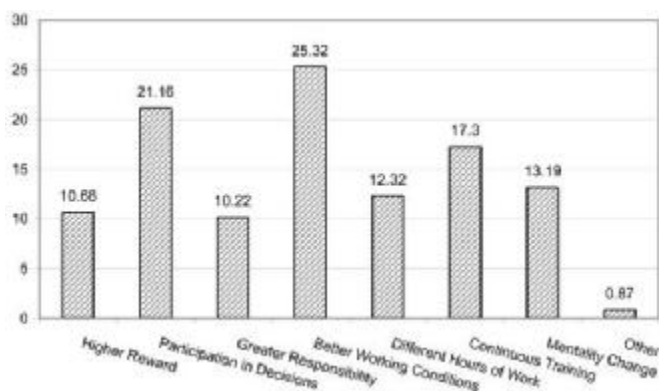


Source: Goulielmos 2004 (inspired by McMaster).

One strange fact for ICT is that 72% of the staff has never been asked of how to increase their production! In their opinion 8 factors shape port productivity as shown in figure 12: (1) better working conditions (25%), (2) decision making participation (21%), (3) continuous training (17%), and (4) mentality-cultural shift (13%). Then followed by those wanting different hours of work (12%), higher rewards (11%), and undertaking greater responsibility (10%)².

FIGURE 12

Productivity factors indicated by staff working in the port (ICT)



Source: Pardali A, 2004.

4.5 Quality implications

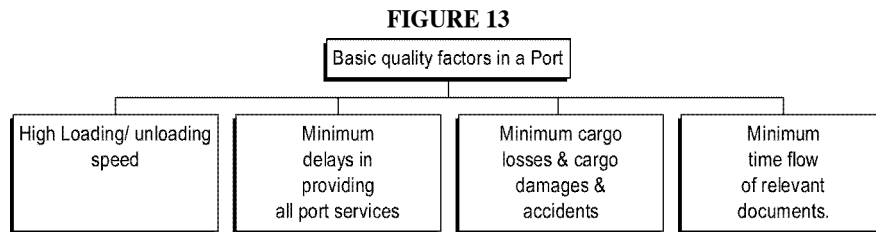
The new science of complexity states that an organisation that perceives complaints as positive feedback, is more likely to improve its service processes

(Battram, 1996, p. 166) (investors in People-IIP awards). It is time to recall people to the meaning of their work (ask: what called you here?) (Wheatley, 1999, p. 132).

In a port, quality components can be summarised to be covered in a port economic term «fast turnaround time» and more explicitly in the figure below: speed of unloading/loading, reduction of all kinds of delays affecting vessel's departure, the frequency of damages to cargo and loss of it, and faster documentation processing.

A rhetoric definition of quality is the capacity of a service- via certain properties, characteristics or qualities-to satisfy a stated or conceived need of the user (Spanos, 1993; Goulielmos, 2001). «Quality must be measured» is an old slogan, but this is difficult as this can be done via quantification of qualitative properties.

The international practice to counteract this is the use of questionnaires using frequencies.



Source: Goulielmos, 2004.

To assess port quality and especially to find out whether quality has been improved after or since port deregulation in 1999 (though more time is needed for safer conclusions) in the ICT, we decided to compare our investigation in 1994 (Pardali A, 2000) and in 1999. In 1994 we have sent questionnaires to 30 selected port agencies and we have obtained 19 replies (63%). The sample was representative as these port agencies look after the 88% of all arrivals of container ships. In 1999 the questionnaires were sent to all 33 agencies and the respond ratio was 82% (27), which look after the 99.5% of all container ship arrivals. Our findings can also be used as a criterion for successful management between 1994 and 1999 towards acquiring a competitive advantage through better quality. The questions have been related to a marking system with excellent being the number 10.

As shown in the table 1 there is a *slight* 0.46% improvement in the grading

of the port services between 1994 and 1999. But given the time elapsed and the areas of improvement (like computerization, communications) which are not as important as e.g. stevedoring, which has too improved.

In the area of delays there is no one not to be affected! Demand, too, has pushed situation out. The 79% of users reported in 1999 frequent delays (65% in 1994), the 12% very frequent delays (23% in 1994) and the 9% rare (12% in 1994). So, delays became *more frequent* which means a deterioration of quality level and a slower turnaround speed. Delays factors are presented in figure 14 below.

TABLE 1

Average gradation of port services at ICT (1994 & 1999) by users' agents, 0-10.

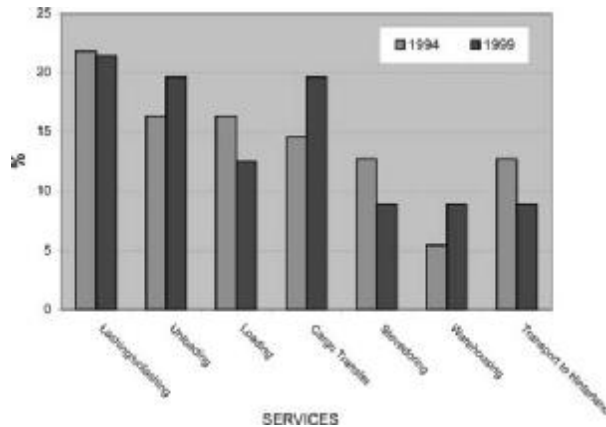
SERVICES	1994	1999	Change (%)	Provider
1. Lashing/unlashing	1,95	3,63	+86,1	State
2. Unloading	5,84	6,04	+3,4	PP S.A.
3. Loading	5,58	5,85	+4,8	As above
4. Transport	5,37	5,44	+1,3	»
5. Stevedoring	4,06	5,08	+25,1	»
6. Warehousing	5,05	4,40	+6,9	»
7. To hinterland transport	5,26	5,67	+7,8	Private
8. Formalities	4,79	4,50	-6,1	PP SA
9. Computerization	2,42	3,00	+24,0	As above
10. Telecommunications	3,89	4,52	+16,2	-
11. Repairs	5,00	5,59	+11,8	Private
12. Drydocking	4,88	5,59	+14,5	»
13. Supplies	6,68	6,96	+4,2	»
14. Bunkers	7,32	7,12	-9,7	»
15. Slop reception	4,65	4,68	+0,6	»
Average	4,96	5,42	+4,6%	-

Source: Pardali A, 2000.

The above areas are those where frequent delays occur and these are services provided exclusively by the port and are called *direct* services. Equal (3 x 20% of users) responsibility are given by the users to time for berthing, unloading (12.5%), loading, and transportation within the terminal. The situation is worse in 1999 than in 1994 for unloading, transportation within the terminal and formalities. Berthing delay is almost as bad as it used to be. The delays are due to **maintenance**-frequent breakdowns of Gantry cranes, break downs of other machinery, blackouts and other secondary causes.

FIGURE 14

% of users experienced delays 1994 & 1999 in ICT & kind of delay



Source: Pardali A, 2000.

As far as the frequency of damages, accidents and losses (due also to robbery) is concerned, this has increased since 1994, except robbery, which has been curtailed. Damages to containers, damages to cargo, and robberies (61%) had equal affected users in 1999 (2 x 69%). Port accidents increased slightly, but affected 22% of users. Port quality level is thus low, as the users understand this. A slight improvement has been noted between 1994 and 1999 as port received 4.96/10 marks (average) in 1994 and 5.42/10 in 1999 (good). The services however offered by the port itself have not been improved in any essential way i.e. from 4.51/10 to 4.99/10. Deregulation did not help for this terminal to provide better services. Why?

5. Proposals for counter action of bad performance of ICT based on complexity theory

5.1 Introduction

The problems identified above are too many as shown in figure 3 for a paper to deal with them all. So, we will deal with certain of them being perhaps in our opinion the most important. These are three: Human factor, Productivity & Quality. Productivity and quality surely in ports are the sides of the same coin, unlike other firms. And these issues will be dealt with by using Complexity theory as promised.

5.2 Production Breakdowns

As we have seen above a high percentage (79%) of users in 1999 had frequent delays and this has been increased since 1994 (65%) due to among other reasons to breakdowns of the gantry cranes and other equipment as well as to the supply of electric power. Here we have first to define in an operational way the term «breakdown» as an interruption to the flow of a system that cannot be handled within its automatic processes (McMaster, 1996, p. 196; chap. 15). This definition is for corporations designed for information and maximum intelligence. A breakdown should not be seen as an inevitable event with apathy and with the presumption that all that required being done to avoid it, have been accomplished. We think that this is the situation with ICT.

A breakdown is an interruption that requires thinking, new information or even innovation, so that to return back to productive state of flow. But here important are the design principles (in Toyota one may stop the production line **to learn** by pressing a button). In a port, we have insisted in many occasions, fast turnaround time is essential, as this affects the profits of vessel-the customer. Thus we have to operate at a high level of predictability in relation to breakdowns to gain mastery of our production process.

Important is also the personal development of executives and management. The 80% of failure today of major corporate initiatives is due to *management*. Especially for not handling the breakdowns when presented to them, as management has to provide the environment and the security for dealing with. Employees in the majority of times follow management. Here the ability to see people as co-creators of the corporation is needed. People are a community and managers must compete in the areas of personal *communication* and *relationship* as few will admit that mood, spirit and culture of their firm as their responsibility. It is not the matter that must take precedence over information, but the other way round.

We have to know that our competence is measured by how quickly and effortlessly we are able to produce results, which means of how effectively we overcome interruptions, breakdowns and problems in performance of our promises. People who are considered to be the most competent are those that can still make things happen at all circumstances (even extremely difficult ones). In all ports we want to avoid breakdowns, but we have to see first that breakdowns are an opportunity for *learning*. How can we put that we have to change our sayings? E.g. if it isn't broken don't fix it, should be «replace it before it has time to break».

5.3 Quality Considerations

Total quality management –TQM– promises that quality is a way of life that

has no end. But this demonstrates half of the truth as life if meant to consist of learning and development indeed never ends, but quality ends. We will not discuss here the growing idea that is better to pursue safety than quality where (the first) is especially required³ by ports as our analysis above indicated. This may be a further research project. As put by McMaster (1996, p. 6) «80% of all quality initiatives fail even though every one knows what it takes to have them succeed». In a broader framework one may include the failure of quality efforts to the lack of a theory of organisation that accounts for intelligence! Corporations are long considered and treated as living organisms and that they possess living properties. If corporations have culture, memory, ideology, education, learning, life cycle and many more other properties, why the most important feature, which is intelligence, has so far remained in dark?

The most important audit is for ever-increasing intelligence, while those engaged in TQM are always assessing potential supplier organisations. This means audits in which systems, procedures and processes are evaluated for their effectiveness and completeness. Crucial information however is not provided as they are missing the relationship of people to them. People bring the results, not the systems on paper (going by the rules never really happens). These systems are nothing but a marketing survival tool.

As mentioned above we fail to take the necessary time prior to the inception of the initiative to TQM to develop an understanding of the process and we also neglect the cultivations of ways to make permanent the development of this understanding. A test can be made by the ICT: (a) write down the main principles of TQM; (b) note the success of your efforts in each of the principles and (c) refer to the theory and see how many items are correct. These considerations must be taken into account as deregulation of the port did not succeed to increase quality as we have defined it for ports, being totally different from that used by quality standards and TQM; as fast turnaround time as basic element of port service quality is not mentioned.

6. An account of complexity theory as applied to management

6.1 Introduction

The theory of complexity provides a series of new ways to approach the behaviour of the social and economic systems. Complexity can also be defined as the nonlinear evolution of systems, which show intense complex and unpredictable behaviour (Battam, 1996 & 1999). A system must be understood in the above as a formation, where a set of elements or characteristics of the elements of the set, are complexed one with the other in relations (Ritsert J, 1999). All

systems self exist and the name they get give a description of its general characteristics, its relations and its functions. The above systemic approach is a different view of seeing reality in its entirety. This is opposing to the traditional science where through the analysis of elements one believed could predict and control the behaviour of one system. The new approach is to synthesize the elements and the properties via their structure and dynamics, advancing from the simple to the complex (Josien M., 1995).

The new theory is to abandon the cause- effect mechanistic perception and proceed to a more holistic and ecosystemic. We have to focus to the dynamic processes where the phenomena are produced by the emergence of possibilities that encourage a positive attitude to the unpredictability, uncertainty and innovation. The form of one influence on the other is finally what it shapes the emergence of the behaviour of the system. It is more towards knowing the self-organising and self-controlling as a metaphor for the complex adaptive systems, characterised by non-linearity and dependence on initial conditions (cause and effect are not analogous) and feedback (the future situation of the system depends on its previous state).

6.2 Organisations as complex adaptive systems

Thus firms and ports are nonlinear systems analysed by the nonlinear tools of the new theory (Goulielmos, 2002), and as such being also complex, are emergent, use learning, have to plan and implement innovation (Sony, Merck, 3M) and adapt (Santa Fe Group). Firms as living open systems are in communications with their environment in a state of continuous exchange and analysis of inputs and outputs (to manage destructive entropy). As a result are more important the relationships and communication than processes. The processes that are here more important are those of constant adaptation and learning where complexity of the systems increases through these.

6.3 The Human Element

The Human element is long recognised as the important factor through which management decisions are carried out and the effectiveness of the organisation is accomplished. But despite that progress, the human element remains difficult to be managed properly and this is why we call this element *complex* as well. Humans give firms the live element. Humans shape the culture (the total climate of the firm, its ideology, the rules and procedures within the company, its structure and its organised action towards the accomplishment of certain goals). Culture determines the way people live and work.

Within a firm we have to identify three basic forces or variables: Humane-

Technological and Organisational. These three depend one on the other and influence one the other and determine the behaviour of the system (Seiler, 1967). The basic philosophy is based on the social exchange process between firm and the person. A Man who works, has a set of motivations, which are many and complex, and wants to cover some complex needs by his (her) psychology and from inside him (her). He (she) has his own behaviour and his specific targets. It is not just enough to satisfy his (her) needs of survival –which means reward– but also broader needs like security, recognition within the firm, development of his (her) potential and the accomplishment of personal atomic ends and goals. The place of work is a place of socialisation and where personality is shaped as well as behaviour.

As we have seen above Port of Piraeus–on the basis of sociology- ignores the factors below:

(1) Favourable conditions of work; (2) knowledge-specialisation-training on what one is doing; (3) undertaking initiative & responsibility; (4) global knowledge of the produced service; (5) participation of people in the functions and in the decision making and (6) a flexible management having as goal the coordination of actions and activities that exploit possibilities existed in human element.

Here the theory of complexity is needed as it invests in humans working in companies (Battram, 1996, p. 99) with a target to improve quality and total competitiveness, but this concept must be replaced by the concept of co-operation and co-evolution on the basis of adaptation. The system undergoes continuous changes and optimum solutions do not exist (Axelrod R, 1990). As we have seen people in the ICT are neglected of *how to be rewarded, how to be promoted and how much to be trained* etc.

As far as technology is concerned, more important and more focus should be paid to communicating-not simply broadcasting and receiving messages- but to the participation and to the information flow. Communicating is a dynamic process of behaviours that permits the emergence of solutions *at the time where problems appear*. It is important-something we did not find in the port case-to give the possibility to each working person to express and explain his/her views, and comprehend the total organisation.

The great variety of ideas should be absorbed so that the opposed and reinforced thoughts to be able to be self-organised to each one individually. Whenever working people feel that have equal treatment, they can assemble with knowledge the unknown parts of the wider organisation and be really effective in their specific job. Thus this is the way for working people to participate not only in the representation in the circles where decisions are taken –as demand-

ed by port staff– but also due to the fact that every working person can re-negotiate in a constant way the content of his/her job. At the same time a working person reorganises constantly and improves the way by which job is carried out.

The flow of information certainly is not smooth in the port and new information is brought in by technology or new technologies. These must be accessible and familiar to every body as these take part in production. Here we expect as stated many times constant training and knowledge, undertaking initiatives and responsibilities with an adaptation to changes through the emergence of some possibilities.

Here focus is on organising on the basis of the continuous adaptation of the systems, which is approached nonlinearly in a structure that does not cancel networks and hierarchies. These relationships are conceived differently than so far. The network serves the hierarchy and hierarchy emerges from the network and both are dependent one to the other.

Here the need is for a flexible structure, which can implement new methods of organising the work, to improve its networks, to count on the participation of the user in the improvement of services offered-which we did not see to happen with users' agents in the port terminal examined. Here one may count and reinforce the informal⁴ and interdepartmental teams of work. So, interdepartmental teams provide the possibility of direct solving the problems and the handling of possible crises. The networking also of these teams through exchange-feedback of experiences and methods may change the system of labour conditions towards something that is desirable which is increasing returns.

Moreover, leaders and managers must be nonlinear and adaptive to complexity with a direct participation in the dialogue of working people. Leave aside command and control (Tsoukas, 1998) brought by tradition of mechanistic models. The manager is better a coordinator of the flow and analyser of the information flow; the one that keeps the framework (Battram, 1996, p. 99); the one that recognises and handles the possibilities from the environment.

7. Conclusions

Given the number of ideas and suggestions advanced in this paper, is most difficult to summarize it, but we will try to pin point some main conclusions.

The Port of Piraeus in general and the International Container Terminal at Ikonion in particular, resemble the Newtonian mechanistic model of managing and organizing. The hierarchy is from top to bottom, users are not consulted and

working people is neglected. Practices from the time that the port was a state monopoly has been maintained despite port's «deregulation» in early 1999.

People is recruited with the system of who you know, instead of what you know, and how well (skill). Low educational effort is offered, with the exception of basics in personal computer handling. Training is not extensive on technology and know-how or on modern organizational schemes. We have spotted lack of communication and networking; lack of the philosophy to promote the idea of taking initiative and undertaking responsibilities, which is the basis of quality according to the new theory of complexity. Complete absence of workers participation in decision-making.

We tend to believe that the above situation or model of management and organizing ends up in delivering poor quality, higher than possible cost helped by what we have called the «Greek-Marxian» perception. All these come to a waste of resources.

For these problems mentioned and others like breakdowns in production and in pursuing quality targets as well as management of human factor, have been advanced. Productivity should be improved, the cost should and can be reduced and quality has to be raised, the new way for permanent effect. Port possibilities must be explored paying attention on *port's language, on new communication and networks, new location of hierarchy and inclusion of the concept of the attractor instead of the leader in a team working*. To provide education and training and freedom to state one's opinion, to take initiatives and responsibilities...

Notes

1. Law 2688/99 «for the transformation of port organization of Piraeus and the port organization of Thessalonici into Public Companies», Government Gazette, No 40, 01/03/1999.
2. Given the possibility of multiple answers, the % here does not count to 100%.
3. Legislation adopted in 2004 in the form of International Safety Code for Ports and Ships (ISPS of IMO) following 11th September 2001 events, proved the right of our opinion.
4. Small non-institutionalized teams that work in social organizations with a goal to facilitate the process of communicating and the correction of the negative climate of the firm.

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