

THE CONTRIBUTION OF INFORMATION TECHNOLOGIES TO THE FINANCIAL AUDITING OF ORGANIZATIONS

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Abstract

Activities in all fields of activity are increasingly supported by the information and communication technologies.

This study is the result of a research financed by the grant, called “FINAUDIT – information product for auditing the financial statements of economic agents”. Thus, our research team developed an information product prototype for auditing financial statements, which enabled us to achieve the expertise required for setting some limits of the applicability of the information and communication technologies to this field of activity.

Therefore, we will consider the contribution of certain technologies, like electronic signature, electronic invoicing and cyberspace, to the success of specific financial auditing activities, a field that benefits from a considerable human expertise.

Key words: *IT&C, Accounting, Auditing*

JEL Classification: *D83, L15, L86, M41, M42*

1. INTRODUCTION

Toffler's Technological Periods

With regards to the evolution of the human society, we find *Alvin Toffler's* opinion expressed in 1970 in his book *The Shock of the Future* very interesting, as he states that the last 50 000 years of human existence were divided into periods of approximately 62 years, obtaining in this way 800 periods of social progress of this kind. Here are some *technological distinctions* between these periods: out of 650 periods, *man spent 650 in caves*; the *communication* was possible only in the last 70; the *printed word* was used in the last 6 periods; *time measurement* was made with some accuracy in the last 4 periods; the *electric engine* was used in the last 2; while *most technological break-throughs* were made in the last period (Toffler,1973:26).

We are in the 801st period!

Since 1970 to date, more than half of such a period elapsed. This is the period of development and large-scale use of information technologies and computer. The achievement and the day-by-day operation of the first computer equals the discovery of fire, iron... writing, printing and the list could go on.

Nevertheless, the electronic computer brought the focus again on *information*. At a very basic analysis, we see that the word technology was always used besides everything "topical" for the stage tackled. Therefore, we were the beneficiaries of the *stone technology, the iron technology, agricultural technologies, industrial technologies*, so that we fully enjoy today the *information technology* or the *information technologies*.

It is well-known that the value of information consists in its use, communication and storage. Hence, lately, further to the technological break-through in communications, the concept of *information and communication technologies* gained a wider scope, being now the landmark of building the *globally information-based society*.

2. MODERN ENTERPRISE IN THE GLOBALLY INFORMATION-BASED SOCIETY

2.1. Definition of informational technologies

At this time, there is no unanimous opinion in defining information technologies, however the most relevant of them is to understand them as collections of technological fields that develop simultaneously and inter-dependently. Some of the most important fields are computer science, electronics and communications.

B.H. Boar believes that *information technologies enable the preparing, collection, transportation, searching, memorizing, accessing, presenting and transforming the information in any format whatsoever (voice, graphics, text, video and image). These operations may be made by people alone, people and equipment and/or equipment alone* (Boar, 2001:17).

2.2. Definition of the informational society

Generally speaking, we may say that the information society may be defined as an information-based society. In a modern meaning, we may speak of an information-based society since the use of computers in economy, after the building of the ENIAC in 1947, that is since the second half of the 50'.

However, at each development stage of human society, we may say that we always relied on information. These are a few examples: the abacus (3000 B.C.), paper (50 B.C.); printing device (1452); paper (1700); telegraph (1837); photography (1839); phone (1876); electricity (1882); tabulator (1890); moving picture (1891); radio - television (1920-1936); robot (1921); transistor (1947). All these achievements and moments played their parts at a larger or smaller extent to a better use of information in society.

Therefore, we may say that the globally information-based society is plainly the human society in the time of analysis with the informational modernism print specific to the information avalanche.

2.3. On the cybernetic revolution we live in

The American futurologist Eduard Cornish, in his work "*Futuring. The Exploration of the Future*", sustains that mankind successfully dealt with three great technological revolutions (Cornish,2004:76): agricultural, industrial and cybernetic. The main focus of the cybernetic revolution is the *computer as main technological catalyst and data and information handler*. According to Cornish, six super-trends will mark the future, that is: technological progress; economic growth; improvement of people's health; increase of mobility; decline of the environment; cultureless enhancement.

All these super-evolutions of the human society rely on the first super-trend, which means that the "automation race" goes on until about 2010, under the conditions of a society in which computer, under its various forms, will be omnipresent.

2.4. Waves of information technologies

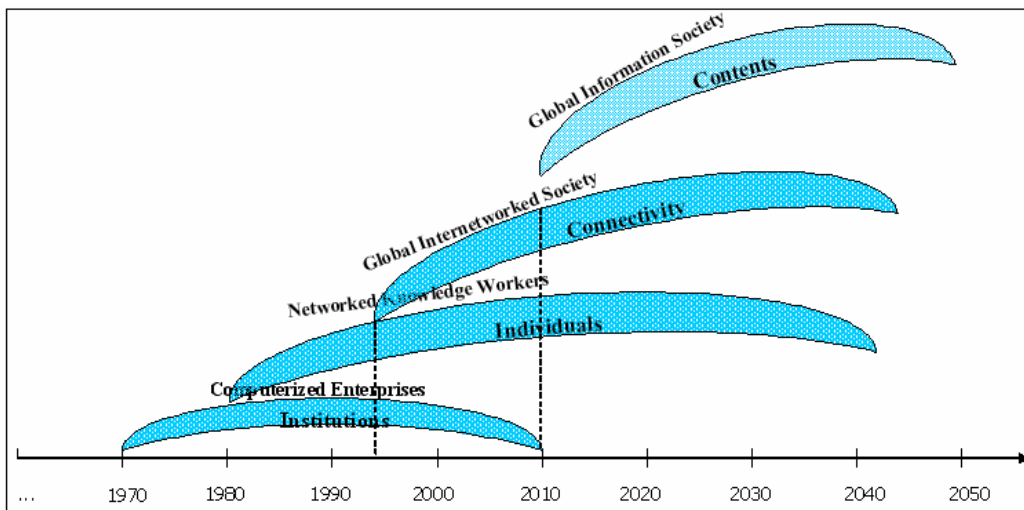
The following years will bring about essential changes in our every day life. Thus, the use of electronic computer will be extended to all activity fields, due to an increase by almost 100 thousand times of the current performance, until it reaches the performance of the human brain, together with a reduction of its sizes to the shape of a chip. The name of this computer will be system-on-a-chip, and its price will be so small that its package will be more expensive than the system itself. At the same time, the information and communication technologies, together with the discoveries of new materials, shall lead to the so-called **Cyberspace**, whose spine will be the INTERNET and the virtuality through digitization. Moreover, the federal government of the USA has recently launched a 5 year research program, financed with 400 million dollars for the future development of the INTERNET, that should be 100 faster than the current one and will be called NREN (Patriciu,1995:4).

At network level, performance will be amazing. Thus, many types of networks are meant to fulfill people's dreams about a wholly or partially cyber-based world and about an information super-highway.

In other words, the grounds of tomorrow's society will be constituted by information and computer-mediated communications. J.A. O'Brien has drawn up a globally information-based society transition chart and he reckons that humanity, in order to reach that point, must go through four waves, namely:

- Computerized Enterprises, corresponding to the period 1970-2010;
- Networked Knowledge Workers, which started in 1980;
- Global Internetworked Society, started around 1992-1993;
- globally information-based Society, which will begin after 2010.

Figure-1: The four waves of information technology



As it is presented in figure 1, until 2010 we will be crossing a period of time when the first three waves superpose, what means we are in a transition period with its specific risks and advantages. Thus, as we can see, humanity has not even gone through the first stage, but two other have already been started and in 2010 the fourth will start as well. In other words, until 2010, the human society is crossing a continuous transition process towards this information world-wide covering. Therefore, the traces of modernity will become even more obvious as we approach 2010, when the first wave of the simple

information technology is completed and the fourth wave is more and more present, namely the “*globally information-based society*” wave.

Literature in the field of informational technologies shows us the fact that subjects like intelligent company, virtual companies, Internet extension, e-commerce, e-bank, e-* and the global automation of the society are trends that mankind cannot avoid. Under these circumstances, companies, with or without their will, must get modernized.

2.5. New digitalized economy

In collaboration with the main technological waves, the new economy came about the 70's last century, when economic entities could afford financially investments in the field of the automation of the main informational flows. In time, this process extended in most organizations becoming the base of the future globally information-based society.

Under these conditions, the *new economy* will rely ever more on information and communication, which means that information will be used as a production factor, the recognition and the extension of the virtual goods (assets).

The specialized literature (O'Brien 1999:25, Bergeron 2002:47, Brynjolfsson and Kahin 2002:67, Eckes Jr. and Zeiler 2003:78, Josserand 2004:69) insists on the so-called *digital economy*, marked by the networking of the economic entities, by entity's flow and process digitalization and by the creation and the exchange of digital assets (virtual assets) against the background of the physical extension and the development of Internet as a master network of all networks.

2.6. Implications of the information technology in the modern enterprise

However, on its way to modernity, the current enterprise is the scene where the transition operations to the future globally information-based enterprise take place.

In all this factorial and information labyrinth, the enterprise has to become modern, furthermore, on these modern ideas “ready modernized” companies are created, meaning companies that 20-30 years ago were not even envisaged as existing. It is the case, for instance, of the Internet providers that did not exist 20 years ago, but that are now the support of a new network of new, modern companies: from electronic commerce advertisements, to personal business and outsourcing services provided to big companies.

If the existing companies have to accept to survive in this globally information-based environment, it is important to be aware of the characteristics they have to have, in order to undergo an efficient modernization process. After analyzing a significant number of companies and corroborating the results with the trends of the future globally information-based society, we reached the following set of main characteristics for the future enterprise: *flexibility, opening, receptivity to integration, globalization and intelligism.*

With regard to administration, there will be numerous changes required by the innovations in the field of information and communication technologies, but also by respects regarding the continuous enterprise engineering and the re-design of their specific activities.

Hence, the main technological implications of information and communication technologies meant for the enterprise administration, will comprise as follows:

1. The processes that will be conducted in the enterprise will get a strong informational character, meaning that their afferent flows will be described in detail, which will lead to the increase of the enterprise. From the perspective of administration, this digitization of the information related to enterprise flows and processes will lead to the easier enterprise modeling, to a multidimensional description of technical-economic phenomena and processes and, why not, finally to scale economies;
2. The direct consequence of the informational character described above is that we are going to assist to an **extension of the integration process** between the enterprise functions. Under these circumstances, the enterprise administration will be influenced by the effects of the use of integrated enterprise applications, by the possibility of large-scale use of the sensor ultra-specialized in production processes, by information products meant to control industrial processes, by the extension of micro-systems or one-chip-systems, the large-scale use of robotics and other applications of the field of artificial intelligence etc. Hence, we shall assist in a closer or farther future, to a **generalization of the integrated administration of technical-economic processes** and to man's minimal interventions in this administration;
3. The coupling to information and communication technologies will facilitate the enterprise administration-specific activities, which will result in a **systematization of the realities in the life of the enterprise** with remarkable influences in the process of implementation of the international quality standards until the level of Total Quality Management is achieved;
4. The new work forms and the e-activities specific to the globally information-based society will be used ever more in the enterprise. In enterprise management, **decisions will be made** irrespective of place, distance or time. Moreover, certain problems regarding employees' management will be avoided and even eliminated;
5. The future Internet (NREN), which will be 100 times more powerful than the one existing today, will lead to a real-time information exchange and to a large volume of information. For the enterprise management, problems regarding the achievement of such virtual enterprises, the communication between various regional divisions/departments in case of big companies will appear, which will lead to making more documented and better decisions. Under such

circumstances, the processes of service virtualization and outsourcing will be more obvious;

In our opinion, a real-time enterprise administration will lead to the elimination of some inherent exploration risks, further to the possibility of making decision in due time.

3. FINANCIAL AUDIT IN INFORMATION-BASED SOCIETY

3.1. Stage of financial audit computerization in world

Under the conditions of enterprise globalization, automation and modernization as information and communication technologies develop and improve, in the last two decades the importance of the financial audit increased constantly because of the economic-social impact of true or untrue financial statements on the market of specific information users.

Events as Parmalat, Enron etc. fully showed what means to lose control over the financial auditing activity in economies of developed balanced countries. To avoid such events, the solution had also to cover the information field that could not be avoided for ever. Thus, in USA the Law Sarban Oxley came out, while in France came out the Law of Financial Security. By these laws, computer science plays a crucial part in the quality of the financial information and the information manager bears the same responsibility as the financial manager.

Under these circumstances, the financial auditing cannot be made but with information means by which the integrated information processed according to minimal standards is extracted, processed and audited.

At an international level, there are preoccupations to consider enterprise flow digitalization a major variable in two respects:

- by developing information applications;
- by developing standards that treat the problems of financial statement auditing in information-based environments.

In the current society based on information, which is more and more based on knowledge, in which the achievements in the field of artificial intelligence are more and more promising, it becomes imperiously necessary that the professional of the financial audit field should be endowed with as many work tools as possible based on the newest information and communication technologies.

By the means of the International Audit Standard no. 400, titled *Audit in an environment of computer systems*, there are determined a few criteria for the evaluation of the risk in an audited entity that avails of a partial or integrated accounting information system. We

consider that it is necessary to resume and materialize the issue of accounting and audit automation in standards that should take into account the specific technological system of an information-based society.

Recently, INTOSAI¹ Standing Committee on IT Audit centralized in a published report the situation of the use of automated products in the field of financial audit and IT. In table 1 we present this situation.

Table-1: Software used in financial auditing on international level

Country	Down-loading	Data extraction & analysis	Sampling
Australia		IDEA, Excel NT	IDEA NT
Bahamas	IDEA Windows 98	IDEA Windows 98	IDEA Windows 98
Bahrain		IDEA Windows	IDEA Windows
Barbados		IDEA DOS	
Belgium	ACL Windows 95 / NT	ACL Windows 95 / NT	
Botswana	Connect OS Windows	IDEA Windows	
Brazil	Excel/Tempus Windows 95 / MVS	Access/Excel Windows 95	
Brunei		ACL Windows	ACL Windows
Canada	IDEA/CAATS Windows 95/DOS	IDEA Windows 95/DOS	IDEA Windows 95/DOS
China	Foxpro Windows 95	Excel Windows 95	
Colombia	IDEA, SQL Windows, Unix	Excel, IDEA Windows	

¹ INTOSAI is the professional organization of supreme audit institutions (SAIs) in countries that belong to the United Nations or its specialist agencies.

Country	Down-loading	Data extraction & analysis	Sampling
Costa Rica		ACL, Oracle Browser Windows	
Croatia		EKOFINA Win 3.1 Effect Dubrounix CBO	
Cyprus		IDEA DOS	IDEA DOS
Czech Republic		IDEA Windows	
Denmark	Access Windows NT/2000	Access Windows NT/2000	Access Windows NT/2000
Ecuador	IDEA / Excel Windows	IDEA / Excel Windows	
Ethiopia		IDEA Windows 98	
Fiji	ACL Windows	ACL Windows	ACL Windows
Finland		ACL Windows	ACL Windows
Germany		IDEA V1.2 Windows	IDEA V1.2 Windows
Greece			IDEA, EXCEL
Grenada			IDEA DOS
Hungary		IDEA, SAS Windows 98	IDEA, SAS Windows 98
Iceland	Entire Connection Software AG. Windows	ACL Windows	ACL Windows
India	IDEA Windows	IDEA, MS Access Windows	IDEA Windows
Indonesia	ACL Windows		ACL Windows
Iraq		FoxPro2 DOS	123 DOS

Country	Down-loading	Data extraction & analysis	Sampling
Ireland	Entire Connection Software AG Windows	ACL Windows	ACL Windows
Israel	The auditee downloads the data to PC and we transfer it to our equipment	Excel, Access, IDEA, SPSS, Wizrule Windows	SPSS, IDEA Windows
Japan		SQL, Oracle Unix	
Jordan		IDEA Windows	
Korea	Unix, Telnet, FTP Unix, Windows	Excel, IDEA DOS, Windows	IDEA Windows XP
Lesotho	Yes DOS, UNIX	Yes DOS	Yes DOS
Malaysia	ACL DOS/Windows	ACL DOS/Windows	ACL DOS/Windows
Malta		IDEA Windows	IDEA Windows
Mauritius		IDEA DOS	IDEA DOS
Mexico	1 Q SQL AIX	Excel, SQL, IDEA Windows, AIX 3 2.5	
Nepal		Excel, Access Windows 98	
Netherlands	Easytrieve DOS	IDEA Windows	IDEA Windows
Netherlands Antilles	IDEA	IDEA	IDEA
Norway		IDEA/SPSS Windows	IDEA
Oman	ACL ver. 5 Windows 95	ACL ver 5, MS Access 97 Windows 95	

Country	Down-loading	Data extraction & analysis	Sampling
Papua New Guinea	Laplink, ACL, Autoimport DOS, Windows 95	ACL Windows 95, DOS	
Philippines		IDEA, ACL, SQL DOS, Windows	ACL DOS
Poland	ACL Windows	ACL Windows	ACL Windows
Puerto Rico		IDEA Windows	IDEA Windows
Russia		Oracle Discoverer Application Software Win NT 4.0/Solaris	
Saint Lucia	PC Support Windows	IDEA Windows	IDEA Windows
Saudi Arabia		IDEA 3.03 Windows	IDEA, ACL Windows
Slovenia		IDEA Windows	
South Africa			ACC Windows
Spain	Excel Windows		
Sweden		IDEA	
Switzerland	Made by Client Windows 2000	ACL Windows 2000	ACL Windows 2000
Tanzania			
Thailand	ACL Windows	ACL Windows	ACL Windows
Trinidad & Tobago		IDEA Windows	IDEA, Excel, FoxPro Windows
Tunisia		Systems pertaining to the organization DOS	

Country	Down-loading	Data extraction & analysis	Sampling
U.K.	Various	IDEA Windows 2000	IDEA Windows 2000
Ukraine	SQL Win NT 4.0, 2000	SQL Win NT 4.0, 2000	SQL Win NT 4.0, 2000
Uruguay	ACL v. 6.5 Windows	ACL v. 6.5 Windows	ACL v. 6.5 Windows
Zimbabwe	IDEA Windows	IDEA Windows	IDEA Windows

Source: <http://www.intosaiitaudit.org/directory/topic/Audit1.html>

The previous table shows that there are countries which do not have the practice of using such an information product in the financial audit field or countries which use it by means of applications developed within the organizations, which are, most of the times, unstandardized and hard to generalize.

3.2. Stage of financial audit computerization in Romania

I saw in the previous paragraph that at an international level, there are various information-based solutions for auditing the financial statements of economic entities. The best known products used on the market are IDEA and ACL for Windows or even for DOS, to which a series of national products is added. Let us note that countries like Turkey, Bulgaria, Italy, Moldova, Romania do not appear as users of such information-based solutions.

Furthermore, we have to mention that the prices of these products surpass in the commercial version 5000 USD, which is a problem for the enterprises of countries in course of transition.

Romania currently makes shy attempts at employing the IDEA information product used by a part of the National Audit Office of Romania, and to a smaller extent by the private audit offices. On the other hand, international audit offices use information products meant for audit activities in companies whose partially integrated business computing and accounting programs are audited. This limitation of the use of financial audit information programs is justified by:

1. a developing financial audit market;
2. rather aged financial auditors;
3. considerable IT investments required;

4. lack of an integrated information system of the company which is the beneficiary of the audit activity;
5. high price of automated products.

As concerns the coverage of the financial audit market, one should note that our research shows that about 95% of the financial auditors active on the market do not use an computerized solution for auditing the financial statements of their clients, while, on the other hand, the latter use MSO Word and Excel on a large scale, when preparing the financial audit files needed for drawing a conclusion. In other words, computers are used as audit file "type writers" and storing and finding devices. The rest of 5% of the financial auditors work with foreign audit companies that provide them with modules ready to use for the partial preparation of the financial audit sections². All these justify the need for a wider use of information products in this financial audit field.

3.3. Our contribution to the financial auditing activity automation

Further to the challenges at a technological level, to the ever more complex practice and to the restrictions imposed to the financial auditor, we considered necessary to focus on making easier his work and on increasing the quality of the information available. Thus, since 2003, we made a team of 25 specialists in financial auditing, accounting, information technologies, statistics and last but not least, in the border fields mentioned before. The team comprised PhD students, PhD in sciences and specialists, including appraisal and financial auditing companies.

In about four years, more than 30 automated-auditing works were written, concepts of auditing automation were created, research studies were conducted for doctoral thesis and two information modules were developed for financial auditors.

Vom prezenta mai jos, în sinteză, câteva informații despre aceste două module informatice.

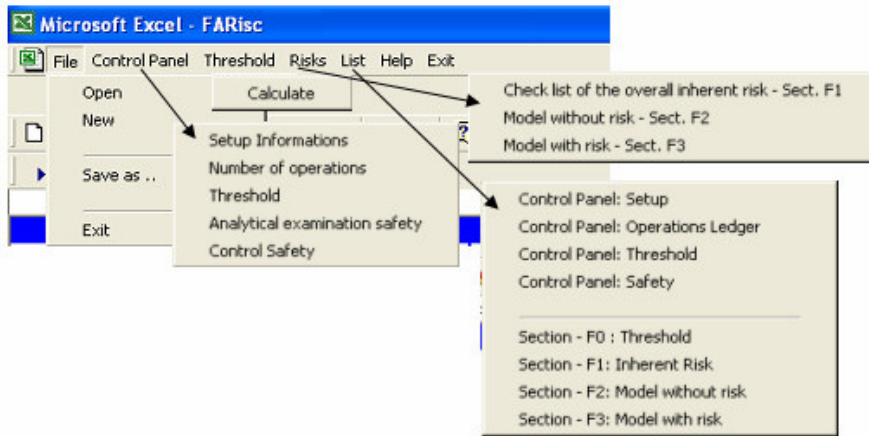
a. FARisk is a module specialised in the section F – Audit approach. This module is developed under MS Office Excel with VBA support and has a main menu that enables:

1. File handling (**Files**);
2. Determination of the work parameters (**Control Panel**);
3. Calculation of the significance threshold (**Threshold**);
4. Determination of risks per various section to audit (**Risks**);
5. Possibility to print audit sheets (F0, F1, F2 and F3) and the data introduced in the control panel (**Lists**).

² These data result from a survey we performed in December 2003 among professionals in 6 counties in Romania.

In figure 2 we are presenting the menu of the application FARisc and the associated options.

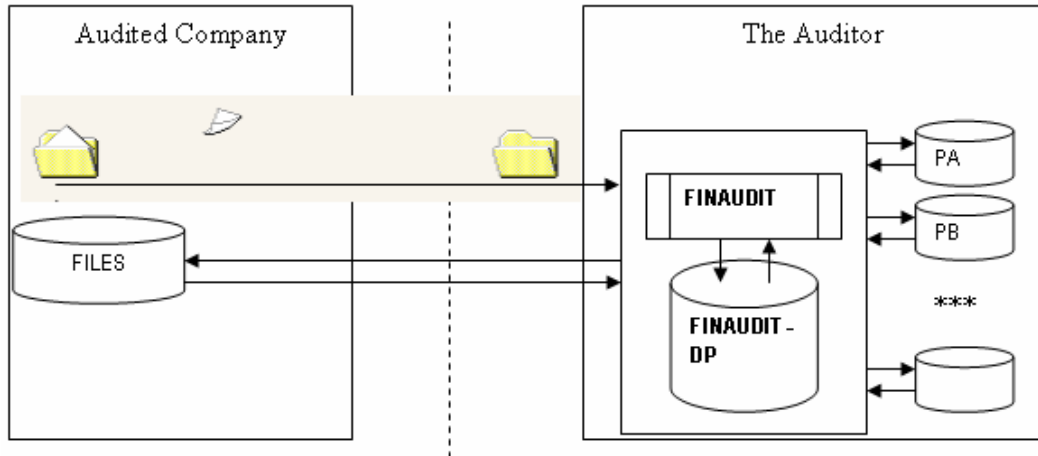
Figure-2: The main menu of the FARisc application



b. FINAUDIT is an software for the financial audit must settle two basic components of a financial audit file, that is: the permanent file and the current file of the audited company. At this moment, the FINAUDIT (<https://portal.feaa.uaic.ro/sites/audit/Expert/default.aspx>) prototype settled from a conceptual viewpoint the permanent file.

From a conceptual viewpoint, FINAUDIT is designed as a module that meets the demands of the audit company and of the beneficiary company, it enables various security levels for information updating between both partners. In other words, on the server of the audit company FINAUDIT is installed and the audited company by an authorized agent, shall have the possibility to access the permanent file in order to view and to add information in an electronic format. The auditors of the audit company shall take over the electronic files and shall attach them as enclosures to the specific section of the permanent audit file. Hence, we shall make more efficient the work of collecting the documents necessary for the development of the permanent audit file and we shall contribute to the enhancement of the financial audit quality. In Figure 3 we have the work schemata between the two partners of an audit file.

Figure-3: Work schemata with the module Permanent file of the information product FINAUDIT



The stages of using the DP module (permanent file) of FINAUDIT consist in:

1. Installing FINAUDIT with the audit company;
2. Installing the module DP with the audited company (client) and the assignment of a username and of a password;
3. Generation of the database for the client at the audit company;
4. Joint preparation of the work sheets PA, PB ... PF;
5. Viewing data and information on the permanent file at any time by the client;
6. Adding information (enclosure electronic documents) by the client;
7. Auditor's using the new documents as enclosures to the sections PA, PB ...;
8. Printing at request the permanent file.

4. TECHNOLOGICAL AND SOCIAL IMPLICATIONS OF IT&C ON FINANCIAL AUDITING

Our experience in management computing, accounting and financial auditing, the practical achievements in interdisciplinary fields for more than 14 years, enabled us to distinguish the following groups of implications of IT&C in the activity of financial auditing.

a. Tehnological implications

We consider that from the viewpoint of the auditing methodology IT&C will lead to a change in how the financial auditing is made. As all the enterprise functions are

integrated, such as: Internet, Enterprise Resource Planning, on-line payments, e-commerce, virtual enterprises, e-invoice, digital signature etc. they will speak more and more of a *technology of financial auditing in information-based environments*.

We shall be able to speak of *specialized intelligent agents in just-in-time auditing of digitalized flows* integrated at a microeconomic and even macroeconomic level. These agents will supervise and will report by means of work charts the critical times, operations and points of the integrated processing of financial information.

The information will be checked by on-line cross control, which will allow the blocking of some un-compliant highly hazardous operations.

In this way, information and communication technologies will lead to the increase of the internal control reliability in organizations and to its use at a large extent in the financial auditing.

An important part in this financial-audit layout will be played by the bank system that will provide the necessary information to guide auditors to un-compliant or highly hazardous operations. Information and communication technologies will support the bank system, such as: e-banking, e-commerce, on-line payments etc.

b. Social Implications

From a social perspective, we shall see that supervision in fully automated environments will eliminate un-compliant, underground and parallel financial flows of the economy. Therefore, outlaw operations will reduce at a large extent as technologies like e-invoice and e-signature will be used.

The funds saved by these measures will be oriented to implement highly-efficient auditing technologies, which will lead to an e-governance of the globally information-based society. For such a society, the auditing procedures should be permanently updated.

To this respect, we anticipate that a *database of commercial incidents between partners* will be built, with un-compliant and highly hazardous data, which will be the starting point in audit planning.

The social role of the financial auditing will be ever greater, because the information and communication technologies will improve its efficiency and its applicability.

6. CONCLUSION

If all the operations taking place in an enterprise make the object of the financial-accounting activities, as we emphasized in the previous paragraph, there naturally results that the database of the digitized enterprise's accounting will comprise Just-in-time all the information required for the financial-accounting audit. Thus, the financial balances auditing e-activity in the digitized enterprise shall become much simpler.

From an information viewpoint, the financial balances auditing activity in the digitized enterprise environment shall require the handling of a large amount of data, which will lead to the extension of the use of multimedia databases and corresponding management systems. In order to support this conclusion, we mention the achievements in the communication data field, especially multimedia data handling and accessing in the 3G telephony.

We may say that, due to the extension and generalization of the financial-accounting e-activities, the financial audit shall become easier to approach by a practitioner in the field, familiar with the information and communication technologies.

The continuous digitization of the enterprise flows and the extension of the financial e-activities, will have the following *organization implications*:

1. *Removal of human errors.* These information and communication technologies will implicitly lead to a greater standardization of procedures and to the compulsory compliance with problem-solving algorithms;
2. The procedures standardization through automation will result into an easier *standardization* of quality management and accounting harmonization;
3. *The inner control and financial audit* will become attractive and efficient from all viewpoints.

All these possible enterprise and accounting achievements will immediately lead to the *removal or limitation of tax avoidance*, since in a digitized enterprise everything is recorded and can be checked.

However, from the viewpoint of the information and communication technologies professionals, as well as from the viewpoint of the accounting and audit professionals, we cannot end this presentation without pointing out the most important conclusion of this study, namely: due to the extension and generalization of the financial-accounting e-activities, we shall achieve the implementation of an *e-Accounting*, as the basis of a *digitized enterprise*, which will implicitly lead to the achievement of a real-time accounting.

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