

# A Comparative Study of Information Science and Technology Evolution in the USA, France, and Romania

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## Abstract

The interest of Romanians for Information Science - as a new scientific field - began to develop itself during the years 1970 - 1980, among information officers, researchers and university professors who had established relationships and exchanges with some Western European and American information scientists.

Actual Romanian terminology in Information Science and Technology – based mainly on neologisms – is largely influenced by the English language, despite the privileged status of the French language in Romania and its former stronger influence.

This paper presents basic events in the history of Information Science & Technology, in the USA, France and Romania as well as examples of English and French language influences on Romanian language terminology

## 1. Some Figures About Today Romania

Romania is one of the 45 sovereign states of today's Europe. It is a medium-sized Central European country facing actually two main challenges: *the full integration into Western-European and Euro-Atlantic structures and practices* as well as *the transition to the Information Society*.

After year 2000, the Romanian economy reached a relative macroeconomic stability, characterised by *high growth* (in 2006 the GDP growth rate was 7.7%, i.e. one of the highest rates in Europe, according to the Romanian Statistics Office), *low unemployment* (4.9% in March 2007, which is very low compared to other middle-sized or large European countries) and *declining inflation*. With a GDP per capita of US\$9,869 in 2006, Romania is considered today an *upper-middle income economy*.

It became a Full Member of the European Union since 1 January 2007. The Romania's economy is today predominantly based on *services*, which account for 55% of GDP, even though *industry* and *agriculture* also have significant contributions, making up 35% and 10% of GDP, respectively.

The average *gross wage per month* in Romania is 1367 lei as of March 2007, equating to €405.11 (i.e. US\$535.80) - based on international exchange rates (or US\$846.06 if based on purchasing power parity).

Romania's area is 237,499 sq. km (91,699 sq. mi) – somewhat smaller than New York and Pennsylvania combined. Romania's population is 21.6 million (December 2006) – i.e., about two times the population of New York's metropolitan area. But Romania's population density is about three times higher than the USA's. About 89% of its people are ethnic Romanians.

According to the US Department of State (<http://www.state.gov/r/pa/ei/bgn/35722.htm>),

*“Romania is a country of considerable potential: rich agricultural lands; diverse energy sources (coal, oil, natural gas, hydro and nuclear); a substantial, if aging, industrial base encompassing almost the full range of manufacturing activities; an intelligent, well trained workforce; and opportunities for expanded development in tourism on the Black Sea and in the mountains (...).*

*Since the fall of the Ceausescu regime in 1989, successive governments sought to build a Western-style market economy. The pace of restructuring was slow, but by 1994 the legal basis for a market economy was largely in place.(...)*

*Following the tragic events of September 11, 2001, Romania has been fully supportive of the U.S. in the Global War on Terror. Romania was invited to join the North Atlantic Treaty Organization (NATO) in November 2002 and formally joined NATO on March 29, 2004 after depositing its instruments of treaty ratification in Washington, DC..(...)*

*At its Helsinki Summit in December 1999, the European Union invited Romania to formally begin accession negotiations. In December 2004, the EU Commission concluded pre-accession negotiations with Romania. In April 2005, the EU signed an accession treaty with Romania and its neighbor, Bulgaria, and in January 2007, they were both welcomed as new members.”*

## **2. Development of Information Technology and Information Science in Romania**

The former socialist-communist rule kept Romania isolated from the Western World for almost half a century (1945-1989).

During the years 1970s, the Romanian Government borrowed heavily from the West in order to build a substantial state-owned industrial base, including *electronics components and equipment manufacturing industry* – the forerunner of today information technology industry..

The interest of Romanians for Information Science - as a new scientific field - began to develop itself during the years 1970-1980, mostly among information officers, researchers and university professors who had established relationships and exchanges with some Western European and American information scientists. In addition,

Consequently, *Romanians were and are able to develop Information Technology and Information Science, as fundamentals of their future Information Society* – this is one of the main conclusions of my book entitled “*Information Science and Technology - Genesis and Evolution*”, published in 2006 by Denbridge Press Publishing House, New York. [1].

This book contains (within its 426 pages), the following 6 main chapters:

- 1 - Information as the Object of Information Science*
- 2 - Information Science Genesis*
- 3 - Information Science Evolution*
- 4 - Information Technology Evolution*
- 5 - Information Science and Technology Development in the United States of America and France, as Models for Romania*
- 6 - Information Science and Technology History in Romania*

According to the French Professor Claude Gimenes, Ph.D- who wrote the Foreword of the book:

*“This book represents research based on a triple point of view: scientific, technical and historical.*

*At the dawn of a millennium in which we will see the fullness of the Information Society, this book invites us to perceive the worldwide achievements of Information Science and Technology, which are the fundamentals of the future Information Society.*

*The historical approach is rich and relatively exhaustive. The scientific and technical contexts are always present in the writing, which is consistent and managed with the constant care necessary and sufficient for comprehension.*

*The topics are generous but the extensive content of this book can be explored without difficulties since the author's style is both precise and concise. The text is continuous and linear, in spite of the insertion of important citations which provide adequate coherence and allow the reader to avoid searching and examining, a posteriori, a multitude of bibliographical references.*

*The chapter dedicated to the Romanian history of Information Science and Technology combines the country's history with the transposition of precedent analysis, based on the Latin background common to both French and Romanian cultures.*

*The bibliographical research involved in this book is, in my opinion, extremely important. We have to consider it, on one hand, like the background of this book and, on the other hand, as the basis for future reflections. The reader will surely discover - despite his or her personal knowledge, more or less extensive - many new and interesting issues and challenges."*

### **3. Comparative Evolution of Information Science and Technology in the USA, France and Romania**

Some of the basic events in the evolution of Information Science and Technology in the USA, France and Romania were somewhat historically correlated (see Table 1). This correlation may be explained by at least two main enablers:

- *Dissemination of some fundamental American and French scientific and technical publications within the Romania (as well as the circulation of some Romanian papers and publications within the USA and France)*

- *Relationship, membership and cooperation of Romanian organizations and individuals within IIB / IID / FID as the main international organization for information and documentation (whose members included also organizations from France and the USA).*

Here are some **examples** of such actions:

1. The Western-European movement concerning the development of Bibliography, and the First edition (in French) of the UDC - Universal Decimal Classification - influenced considerably the goals and methods of Romanian librarians and bibliographers. The first systematic implementation of the UDC in Romania was made in 1903.

2. The works of French bibliographers Emil Picot and Emile Legrand were known in Romania and they succeeded to influence considerably Romanian bibliographers' activity.

3. The American Documentation Institute (ADI) , in the USA (1937), and the Romanian Documentation Centre (CRD), in Romania (1940), were founded following the 1935 FID Documentation International Conference based on similar goals and principles, but having very different memberships and facing very different problems. They were both oriented toward dissemination of scientific and technical information.

4. The Romanian documentation movement was represented at the IID / FID Conferences of 1935, 1938 and 1939 (by a Romanian pioneer of Documentation, the engineer Dimitrie Dragulanescu). It is to be mentioned that at the 1938 FID Conference, the Romanian delegation succeeded to present *the first Romanian abridged edition of the UDC*.

French and Romanian achievements in the development of Information Science and Technology show that specific information was almost always quickly disseminated within both countries. In addition, information scientists and technologists of the USA, France and Romania succeeded either to communicate / cooperate or to work simultaneously (but separately – thanks to the Cold War and Iron Curtain constraints), in order to solve similar basic scientific and technical problems related on the document and information processing.

The Table 1 presents comparatively the years of some basic events in the history of Information Science and Technology, in the USA, France and Romania.

**Table 1 - Comparative Evolution of Information Science and Technology in the USA, France and Romania (only Basic Events)**

<b>BASIC EVENTS</b>	<b>In USA (year)</b>	<b>In FRANCE (year)</b>	<b>In ROMANIA (year)</b>
- First printed books	*)	1470	1508
- First telephone	1876	1884 **)	1883
- First automatic telephone switching system	1901	?	1905
- First radio receiver	1913	1921	1925***)
- First public radio broadcastings	1920	1921	1927
- First black-and-white TV receiver	1926	1936	1937****)
- First public black-and-white TV broadcastings	?	1938	1957
- First colour TV receiver	1953	1959	1964*****)
- First public colour TV broadcasts	?	1967	1983
- First electronic computer	1946	1967	1953
- First Documentation organization	1937(ADI)	1961(ADEN)	1940 (CRD)
- First governmental agency for national information policy	1970 (NCLIS)	1973 (BNIST)	1949 (INID)
- First Information Science organization	1968 (ASIS)	1963 (ADBS)	1995 (InfoDocRom)
- First higher education courses in Information Science	1963	1990	1996
- First Information Science Journal	1968	1976	1997

\*) The USA did not exist in the XVth century

\*\*) The principles of telephony were stated in 1854 by the Frenchman Bourseul

\*\*\*) First experimental use (The first Romanian radio-receiver was manufactured industrially in 1949)

\*\*\*\*) First experimental use (The first Romanian black-and-white TV receiver was manufactured industrially in 1960)

\*\*\*\*\*) First experimental use (The first Romanian colour TV receiver was manufactured industrially in 1960)

The data and information provided by Table 1 enable us some very interesting **conclusions:**

1. *The worldwide evolution of Information Science and Technology (IST) was and still is led by the USA.* However, some other basic contributions to IST are due to some of the most developed Western European and Far Eastern countries.

2. Basic events in the evolution of IST in the USA and France have been known and analyzed, for many decades, in Romania (thanks to *scientific and technical publications, international conferences, international cooperation, etc.*).

3. Romania strove to follow the basic development models presented for it - as well as for other countries, especially European ones - by *the USA and France*.

4. Basic traditional and electronic information technologies were introduced in Romania - at least for experimental use – around the time of their advent in the USA or France. They were designed and manufactured as Romanian consumer electronic products, by the national industries. But the development of some of them was strongly influenced by the resource-limited centrally planned economy of Romania (between 1945-1989).

5. Compared with the USA, higher education in Information Science started in France, as well as in Romania, *about three decades later*.

6. In all analyzed countries (USA, France, Romania), besides profit-based companies (providing information products and services), there are both *governmental agencies and nongovernmental non-profit organizations* (acting, usually, as professional associations) involved in national library and information policy.

#### **4. Some Influences in Terminology**

Actual Romanian terminology in Information Science and Technology - based mainly on neologisms - was largely influenced by the English language (see Table 2), despite the privileged status of the French language in Romania and its former stronger influence. (French language was - during at least the last century - the most beloved foreign language taught in Romania – especially in high schools, universities or even privately - for its basic intrinsic qualities: Latin origin, ease of learning for Romanians, expressivity, prestige, elegance, harshness, etc. What is more, in Romania, nobody was ever obliged to learn French!]

This increasing influence of English language on IST vocabulary in Romania may be explained by some *special circumstances* such as:

- Today, the English language is used on web by about 330 million users and French language by only about 56 million users (<http://www.internetworldstats.com/stats7.htm>)

- The use of English language is predominant by far on all software and hardware distributed in Romania

- In Romania, the foreign support for education and training in English is much more effective and efficient as the French / Francophone support for education and training in French. As for example, there is a general lack of CD/ DVD Players and Writers, VCRs, computer assisted educational equipment and efficient educational printed matters within the language classes of Romanian high schools and colleges. Since English and German language classes are generally much better equipped (than those of French, Spanish, and Russian), *Romanian students have become more interested in studying English* and, sometimes, German! Consequently, after 1993, the number of Romanian students studying English continuously increased and the number of those studying French continuously decreased. Nevertheless, there are still a little bit more Romanian students studying French than English; but many students decided to study both of these foreign languages.

- There is no Romanian Language National Policy (similar, for example, to France's national policy on the French language)

Unlike some basic English and French terms (for example “information” and “documentation”), there are in Romanian two different nouns, one representing the concept of “information” / “documentation” as a *product* (“informație”, “documentație”) and another one the concept of “information / documentation” as a *process* (“informare”, “documentare”). This situation may be seen simultaneously as an advantage and as a difficulty. For example, in

Romanian, the terms “Information Science” and “Information Technology” may have some different translations/ meanings.

In the Table 2 there are some examples of the influences provided by English and French languages on Romanian vocabulary.

**Table 2 - Some Examples of English and French Language Influences on Romanian Language Terminology in Information Management**

English	French	Romanian
library	bibliothèque	biblioteca
bookstore/ shop	librairie	librărie
documentation	documentation	documentare/ <i>documentație</i>
information science	science de l’information	știința informării / informației
information technology (techniques)	technologies (techniques) de l’information	tehnologia informației ( <i>tehnologiile informaționale</i> )
communication science	sciences de la communication	știința comunicării
information society	société de l’information	societatea informațională
knowledge society	société de la connaissance	societatea cunoașterii
data processing	informatique	informatică
office automation	bureautique	birotică
computer	ordinateur	calculator
hardware	matériel	hard(ware), <i>echipament</i>
software	logiciel	soft(ware), ( <i>produs-</i> ) <i>program</i>
browser	logiciel de navigation	brausăr
keyboard	tastature, clavier	tastatură
monitor	écran, moniteur	monitor
mouse	souris	maus, <i>șoarece</i>
printer	imprimante	imprimantă
scanner	scanneur	scanăr
digitizer	numériseur	digitizor
byte	octet	bait, octet
reset	réinitialisation	resetare, <i>reinițializare</i>
cybernaut	internaut	internaut
web	toile	web
hacker	fouineur	hacăr
organizer	agenda électronique	agendă electronică
e-mail	mél, courriel	e-mail
chat	causette	club de discuții
fax	télécopieur, télécopie	fax
management	gestion	management, <i>gestionare</i>
marketing	mercatique	marketing
brainstorming	remue-méninges	brainstorming
benchmarking	étalonnage concurrentiel	benchmarking
leadership	engagement de la direction	leadership

## 6. Conclusions

It is obvious that the Internet will finally benefit more and more peoples and organizations. No bureaucracy in the world will be able to resist the democratization and decentralization pressure exerted by the new information technologies. If the current huge “digital divide” [3] will really be bridged, citizens and organizations located in developing countries will have much better and quicker access to the world’s information. Free and right access of the world’s citizens to the right information – a dream of Information Science’s forerunners – will be thus guaranteed.

But, in order not to experience past errors again, it will be necessary to offer to world’s ignorant people the means *to allow them to know*, and to the world’s knowing people, the means *to allow them to decide!* Today’s information technology is already able to do this, in Romania too!

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## **ABOUT THE AUTHOR**

Dr. Nicolae George DRAGULANESCU is a former Fulbright Visiting Scholar of the University of Pittsburgh's School of Information Sciences, Department of Information Science and Telecommunications, as well as a tenure track Professor of the Polytechnics University-Bucharest, Romania, Faculty of Electronics, Telecommunications and Information Technology, Department of Applied Electronics and Information Engineering.

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Prior to joining Polytechnics University – Bucharest, Romania, in 1976, Dr. DRAGULANESCU worked for 6 years as a design / manufacturing / quality / application engineer in a Romanian company producing electronic measuring instruments and mobile radiotelephones.

During the years 1977-1981, he taught courses (in French and English) in Analog Electronic Circuits, Electrical Systems, Signal Theory and Electronic Measuring Methods at the Institute of Telecommunications, Oran, Algeria.

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