# INTELLECTUAL PROPERTY KNOWLEDGE IN MECHANICAL ENGINEERING COURSES

**Cristina Gomes de Souza**
CEFET/RJ – Av. Maracanã, 229
cgsouza@cefet-rj.br

**Ignez Maria Fereira Sarmento**
INPI – CEFET/RJ – Praça Mauá. 07/817
ignez@inpi.gov.br

***Abstract.*** *Engineering area is responsible for a great part of innovation and technological development of a country. The intellectual property is a mechanism to protect the knowledge and provide economical return. Through a patent document is also possible to obtain technological information that allow to identify the technology's state of art and technological tendencies. Although others countries incentive intellectual property culture since fundamental education, in Brazil this theme is not much approached same in engineering courses. The objective of this paper is to discuss about the importance of intellectual property knowledge in the mechanical formation.*

***Keywords****: Intellectual property, engineering education, mechanical engineering, technological development*

## 1. Introduction

Nowadays the notion of competitiveness doesn't limit more the analysis of prices, costs and exchange rates, incorporating factors as economic ordination, infrastructures existence, political-institutional system, and the socioeconomic characteristics, giving emphasis still to subjects as the education level and the scientific and technological development.

It is like this that the technological infrastructure of a country, there inserted its capacity to innovate, it constitutes significant competitive factor in the reports accomplished annually by the World Economic Forum (WEF) and for International Institute for Management Development (IMD) to evaluate and to define the ranking of nations competitiveness (Souza, 2001). The importance of the technological innovation is also referenced for Porter (1996) that says that among the four variables related to the development – earth, capital, work and technology – just the technology stays linked to the competitiveness.

As the great competitiveness differential is the knowledge translated in technology joined to the products, processes and services, governments all over the world come establishing industrial politics as well as guiding the investments in C&T (Souza, 2001).

As Cruz (2000) says the capacity of a nation to generate knowledge and to convert knowledge in wealth and social development depends on action of some institutional agents be able to generate and to apply knowledge. The main agents that compose a national system of generation and appropriation knowledge are companies, universities and research centers, and the government.

And which is the paper of the Engineering inside of a National System of Innovation? The people that develop activities of Research and Development are internationally described in the category "scientists and engineers", such the importance of the engineering in the process of scientific and technological development. It's the engineer that transforms most of inventions and new ideas of how to produce, originating from any knowledge area, in new products, processes or services, in other words, in innovations (Longo, 2000).

Before the exposed, where the university has fundamental paper in the formation of human resources capable to promote the technological development of the country, there is the question: we are forming engineers really capable to generate and to absorb new technologies? Capable to identify, to evaluate and to use the technological information available, stimulating the innovation' generation? Aware of the strategic paper of the innovation and the knowledge and that know about the necessity of its protection in the contemporary world? Are the curriculums of the mechanical engineering courses appropriated to form this professional?

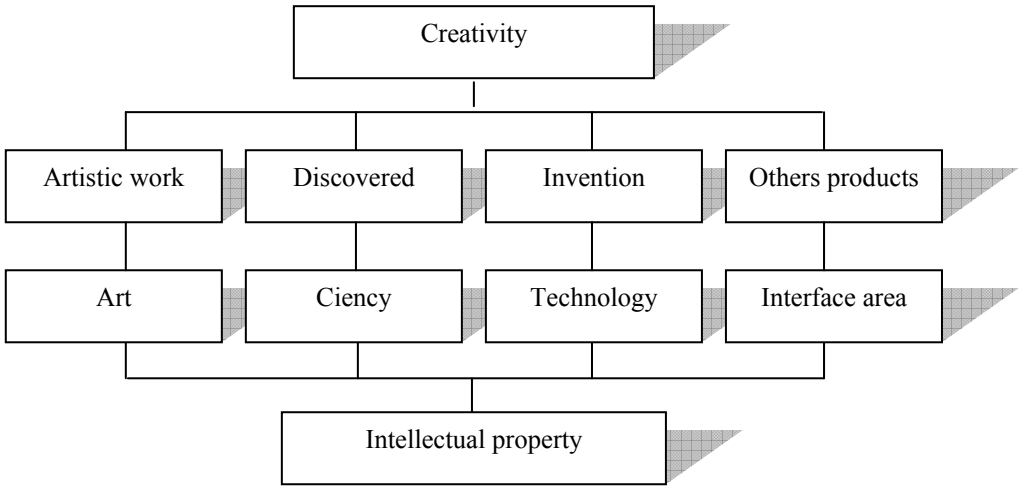
The objective of this paper is to discuss about the importance of a culture of intellectual property inside the engineering, more specifically in mechanical engineering, proposing the insertion of this subject in the curriculum of the course. Besides, to show how is Brazil in the technological race, emphasizing that one of the responsible for these results is the lack of the knowledge in Intellectual Property, mainly inside the engineering.

## 2. Basic concepts

For the understanding of the technological innovation concept are necessary some definitions (Vedovello, 2000):

- Science: group of organized knowledge in a systematic way on observable facts, obtained through the objective study of the empiric phenomena
- Technology: group of knowledge scientific or empiric directly applicable in the production or in the improvement of goods and services
- Technical: combination of productive factors and operations that allow the production of a good or service
- Discovered: perception of something that already exists. It can be the consequence of the individual genius and of the accumulated wisdom. The product cannot have an immediate practical purpose, but it can be used to find specific needs. Examples: oxygen; decimal numbering; surgical techniques; chromosome
- Invention: conception of an idea. It can be the consequence of the imagination to create something. It is usually original and directly applicable. Examples: steel; glasses; he/she calls; penicillin
- Innovation: introduction of a discovery or invention in the economy. It is the union of a technological opportunity with a market need. It can result in: a new product or service; a new production method; a new source of raw materials or of semi-manufactured goods; in the reorganization of a productive section
- Technological innovation: the release of new products or processes or the introduction of significant changes in products or processes already existent.

According to Cabral (2001) behind all those definitions it is the creativity that can show through an artistic work in the field of the art, of a discovery in the field of the science, of an invention in the field of the technology and of other products in the area of interfaces. And all that allied creativity to the knowledge is susceptible to protection consisting of the Intellectual Property as shown in Fig. 1.




Source: Cabral, 2000

Figure 1. Creativity and intellectual property

Intellectual property is divided into two categories: Industrial property, which includes inventions (patents), trademarks, industrial designs and geographic indications of source; and Copyright, which includes literary and artistic works such as novels, poems and plays, films, musical works, artistic works such as drawings, paintings, photographs and sculptures, and architectural designs (WIPO, 2005). In this work, only will be defined the concept of patents.

Patent is temporary property title over an invention or utility model by the State to inventors, authors or others individuals or legal entities holding the rights over the creation. As compensation, the inventor assumes the obligation of revealing in detail all technical content of the matter protected by the patent. During the patent validity, twenty years, the titleholder has the right to exclude third parties with no previous permit of acts concerning the matter protected, such as manufacturing, trading, importing, use, sale, etc.

According to Brazilian Industrial Property Law (1996), a patent needs to show: industrial applicability; novelty and inventive activity. Industrial Applicability means that an idea or creation bean industrially useful. Novelty means that the creation has not become accessible to the public. Inventive activity means that a creation isn't in the technical state. There are two kinds of patent: invention patent and utility model. An invention is a concept resulting from the exercise of the creative capacity of man that represents a solution for a specific technical problem within a specific technological field and that may be industrially manufactured or used. An utility model is an object of practical use, or it leaves of this, susceptible of industrial application, that it presents new form or disposition that it results in functional improvement in its use or in its production.

The constituent elements of the patent document are the first page, descriptive report, drawings (if there is), claims and summary. The first page presents the formal data of the such patent as: name of inventors, country of origin, the title-holder's of the patent name, International Classification and the summary. The descriptive report makes the description of the object of the invention (product and/or process) in way to make possible its accomplishment for a technician in the subject. The contents of the claims, based on the constant information of the descriptive report, it is what determines the extension of the protection checked by the patent.

In Brazil patents request can be directly submitted to National Institute of Industrial Property – INPI that is a federal autarchy founded in 1970, and is part of the Ministry of Development, Industry and Foreign Trade (MDIC). Its main purpose is to execute the rules regulating national industrial property with a focus social, economic, legal and technical function.

## 3. Intellectual property and technological development

In the last years, intangible assets are gaining ground in the value of firms. While in 1982 physical assets represented 62 percent of corporate assets of firms in United States of America, in 2000 they were reduced to 30 percent as shown Figure 2 (WIPO, 2005).

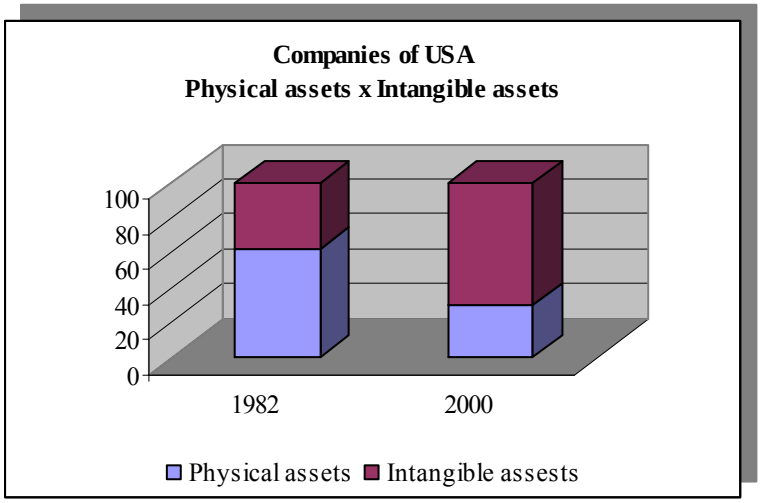



Figure 2. Physical assets x intangible assets of American companies

This situation can be explained because in the new economy is the knowledge the principal wealth of a firm. Nowadays the positive results that the protection of Intellectual Property can have on the technological progress of a country can be seen at the macroeconomical level guaranteeing a financial return that provides more jobs, more knowledge a more development. With the globalization, a lot of countries have done a huge effort to become competitive and an important tool is the technology transfer, including patents, industry design, software register, in other words, Intellectual Property.

In this paper the analysis will be about patents. As Rivette and Kline (2000), there are two reasons for this: *first, patents are the most tangible form of intellectual property they enjoy the strongest legal protection and (except in the media and entertainmen fields) they have the greatest effect on the commercial success and market value of companies today. And second, patent databases are a virtual Alexandria library of information. When combined with new automated data-mining and visualization software, these databases can be powerful sources of rich competitive intelligence* .This happens because using patents' documents it's possible (Delphion, 2005):

- Gain competitive intelligence;
- Monitor industry trends;
- Uncover new markets and market opportunities;
- Identify licensing opportunities;
- Make build or buy decisions;
- Find solutions to technological problems;
- Research merger or acquisition candidates;
- Explore investment opportunities;
- Discover top inventors for recruiting purposes;
- Protect your current intellectual assets.

The importance of patents is so great that one of the indicators of the technological development of a country is the number of patents of this country.

**4. Situation of Brazil**

Unfortunately, although Brazil had been one of the first countries to sign the Union Paris Convention (1883), the first Convention for the protection of intellectual property, there isn't an education politic to create a culture about the subject. Consequently, the country occupy an unfavorable position in the technological race.

Marcuzzo, scientific and technological director of FINEP, says that United States and Japan produce 75% of the international knowledge. About 25% remained, Brazil produce 1,5 %, what is considered reasonable , because *we are producing in important areas to the development as engineering, health, biology, physics, chemistry, mathematics. We are producing very well scientifically, but are not transforming the knowledge in innovation* (SEMESP, 2003).

Table 1 shows the number of publication, by knowledge area, of Brazil in relation to Latin America and to world in indexed scientific journals in the Institute for Scientific Information – ISI in the period between 1981 and 2002.

Table 1. Number of articles of Brazil, Latin America and world published in indexed international scientific periodics in the ISI by knowledge are in 2002 and the percent grow in the period 1981-2002

| Knowledge area | Brazil | Latin América | World | % Brazil in relation to Latin America | % Brazil in relation to the world |
|---|---|---|---|---|---|
| Biology and Biochemistry | 960 | 2.191 | 54.395 | 43,82 | 1,76 |
| Biology Molecular/Genetics | 272 | 587 | 21.338 | 46,34 | 1,27 |
| Computer Science | 80 | 147 | 9.092 | 54,42 | 0,88 |
| Material Science | 436 | 915 | 29.225 | 47,65 | 1,49 |
| Ciências Agrárias | 533 | 1.309 | 17.748 | 40,72 | 3,00 |
| Animal/Plants Science | 948 | 2.830 | 45.037 | 33,50 | 2,10 |
| Spacial Science | 177 | 730 | 8.886 | 24,25 | 1,99 |
| Social Science | 210 | 506 | 26.437 | 41,50 | 0,79 |
| Medical Clinical | 2.004 | 4.323 | 173.634 | 46,36 | 1,15 |
| Ecology | 335 | 989 | 19.885 | 33,87 | 1,68 |
| Economy and Business | 41 | 117 | 10.403 | 35,04 | 0,39 |
| Education | 8 | 25 | 2.645 | 32,00 | 0,30 |
| **Engineering** | **580** | **1.238** | **53.529** | **46,85** | **1,08** |
| Farmacology | 272 | 585 | 15.430 | 46,50 | 1,76 |
| Physics | 2.153 | 4.210 | 93.624 | 51,14 | 2,30 |
| Geoscience | 299 | 872 | 20.556 | 34,29 | 1,45 |
| Immunology | 184 | 388 | 11.968 | 47,42 | 1,54 |
| Mathematics | 249 | 552 | 13.181 | 45,11 | 1,89 |
| Microbiology | 354 | 800 | 16.274 | 44,25 | 2,18 |
| Multidisciplinar | 140 | 293 | 9.181 | 47,78 | 1,52 |
| Neuroscience and C. Comportam. | 385 | 752 | 27.983 | 51,20 | 1,38 |
| Psychology/Psychiatry | 80 | 214 | 19.614 | 37,38 | 0,41 |
| Chemistry | 1.721 | 3.580 | 102.951 | 48,07 | 1,67 |
| Subtotal do ano | 12.422 | 28.156 | 804.902 | 44,12 | 1,54 |

Source: Institute for Scientific Information (ISI). National Science Indicators (NSI).
Produced by: Indicators Coordination - Ministry of Science and Technology, 2005

But referring to the number of patents, that is one of the indicators of the innovation, Brazil had only 1552 patents granted in USPTO – United States Patent and Trademark Office. This number is very little if comparable with others countries as Table 2.

Table 2. Number of patents granted as distributed by year of patent granted in 01/01/1977 - 12/31/2003

| | Pre 1990 | 1990 | 1995 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | All Years |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total, U.S. And Foreign Origin** | **959366** | **99220** | **113955** | **163206** | **169146** | **176084** | **184048** | **184427** | **187053** | **2920402** |
| **Subtotal -- U.S. Origin** | **556267** | **52977** | **64510** | **90698** | **94090** | **97012** | **98660** | **97127** | **98598** | **1631426** |
| Japan | 147441 | 20743 | 22871 | 32118 | 32514 | 32922 | 34891 | 36340 | 37250 | **537833** |
| Germany | 84543 | 7862 | 6874 | 9582 | 9895 | 10824 | 11893 | 11957 | 12140 | **209751** |
| France | 30960 | 3093 | 3010 | 3991 | 4097 | 4173 | 4456 | 4421 | 4127 | **81217** |
| United kingdom | 33754 | 3017 | 2681 | 3726 | 3900 | 4090 | 4356 | 4196 | 4031 | **80000** |
| Canada | 18088 | 2087 | 2447 | 3537 | 3678 | 3925 | 4063 | 3857 | 3893 | **60163** |
| Taiwan | 2674 | 861 | 2087 | 3805 | 4526 | 5806 | 6545 | 6730 | 6676 | **50399** |
| Switzerland | 16564 | 1347 | 1187 | 1374 | 1390 | 1458 | 1557 | 1532 | 1433 | **35397** |
| Italy | 12311 | 1498 | 1242 | 1821 | 1686 | 1967 | 1978 | 1962 | 2022 | **34937** |
| South korea | 650 | 290 | 1240 | 3362 | 3679 | 3472 | 3763 | 4009 | 4132 | **31002** |
| Sweden | 11456 | 885 | 914 | 1346 | 1542 | 1738 | 1933 | 1824 | 1629 | **28308** |
| Netherlands | 10074 | 1046 | 894 | 1382 | 1396 | 1410 | 1494 | 1681 | 1570 | **26719** |
| Australia | 4889 | 517 | 548 | 830 | 832 | 860 | 1031 | 992 | 1047 | **14782** |
| Israel | 2147 | 311 | 432 | 820 | 792 | 836 | 1031 | 1108 | 1260 | **11256** |
| Denmark | 2378 | 204 | 314 | 500 | 588 | 509 | 556 | 559 | 611 | **8119** |
| China,Hong kong | 906 | 151 | 248 | 373 | 413 | 548 | 621 | 589 | 681 | **5808** |
| South Africa | 1190 | 122 | 127 | 132 | 127 | 125 | 137 | 123 | 131 | **2866** |
| Singapore | 82 | 16 | 61 | 136 | 152 | 242 | 304 | 421 | 460 | **2234** |
| China p.rep. | 148 | 48 | 63 | 88 | 99 | 163 | 265 | 390 | 424 | **1996** |
| Russian federation | 0 | 0 | 99 | 194 | 185 | 185 | 239 | 203 | 202 | **1578** |
| **Brazil** | **356** | **45** | **70** | **88** | **98** | **113** | **125** | **112** | **180** | **1552** |
| Mexico | 533 | 34 | 45 | 77 | 94 | 100 | 87 | 105 | 92 | **1459** |
| Argentina | 265 | 19 | 32 | 46 | 46 | 63 | 58 | 58 | 70 | **831** |
| Others (128) | 1957 | 168 | 180 | 367 | 405 | 462 | 521 | 560 | 574 | **6413** |

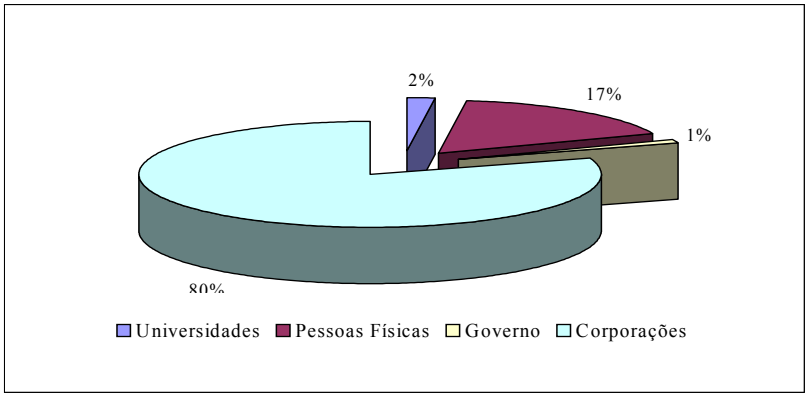
Source: USPO

It's important to say that this article doesn't have the intention of proving that the patents are the most important indicator of the technological development. This is a very controversial subject and there are a lot of studies showing the complexity of getting the causes or consequences to the developing of so many different countries. For example, according to the article entitled "Patents and Innovations Activities: a preliminary evaluation of Brazilian case" by Eduardo da Motta Albuquerque published in "Indicators of Science, Technology and Innovation in Brazil" (Viotti & Macedo, 2003), the author broaches the subject by an economical view and shows the relation between the patents' quantity and the economical situation of some countries, mainly countries in developing. In these cases, there are a lot of indicators to be evaluated and the simple observation of the patents indicators is not sufficient to estimate the degree of technological development. But despite this difficult, is necessary that the society , mainly the students, at least, has the knowledge of this so discussed tool: the patent. The debate on the meaning of indicators will go looking for better and complete information to give support to government and society.

## 5. Patens in the universities

In spite of the important paper of the universities and research institutions in the development of new technologies, the participation of these organizations in the distribution of granted patents is extremely low. In the USA, for example, 2.852 patents were granted to American universities in 1997, representing 2.2 % of the total including national ones and foreigners. Figure 3 shows a comparison among the amount of patents granted to several types of institutions, according to data of the USPTO.

However, it has been altered in the last years. In the period between 1980 and 1998, the registration of patents of the American universities increased 1050.4 % against 151.6 % of the total of registered patents. In 2000, the participation of the universities has grown for 5%.




Source: USPTO

Figure 3. Patents granted for type of institution by USPTO (1997)

The most important in American universities is that this movement didn't limit to a little group of institutions. All American university system aimed at the valorization of their technological portfolios. This happened because it were implemented laws and regulations giving autonomy to the researchers to manage the current technological innovations and allowing mechanisms of technology transfer for the industry. At the same time financial incentives were created for the involved researchers, checking them rights on the intellectual property. As won for the researcher can be described: reception of the royalties; contacts with the productive companies for future partnerships; increase in the professional prestige for the diversification of their activities and for the contribution to the economical progress of the country; and improvement in the work conditions through larger resources for laboratories and departments.

The interest for patents was not restricted to the American universities. According to Assumpção (2000) analyzing the number of patents granted in the USA to foreign universities in 1998, it is noticed strong participation of institutions of Anglo-Saxon origin - Canada, United Kingdom and Australia -, also representing universities of Israel, Japan, Singapore, Hong Kong, Finland, Germany and Holland.

In Brazil, the approval of the new law of industrial property and the elimination of restrictions to the patents in the field of the chemistry and of the biotechnology-the two sections in that the country presents excellence in terms of academic research, there was a positive answer of the universities. Figure 4 displays the requests of patents deposited by universities in the National Institute of the Industrial Property-INPI, since 1990. The significant increment can be observed happened after the law of industrial property (1996). Figure 5 presents the percentile of the universities in relation to the total of deposits of patents, for segments of the society, in INPI along the period from 1988 to 1996.

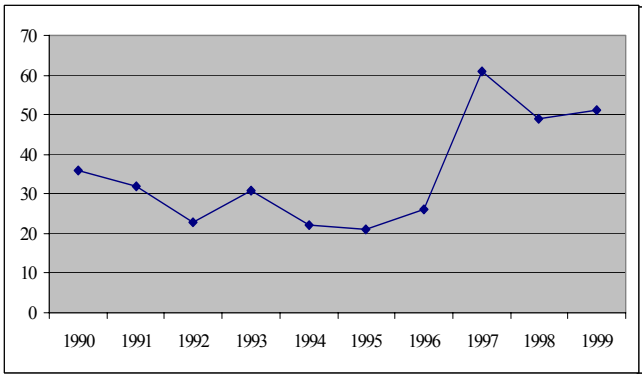



Figure 4. Deposits of patents in INPI for universities

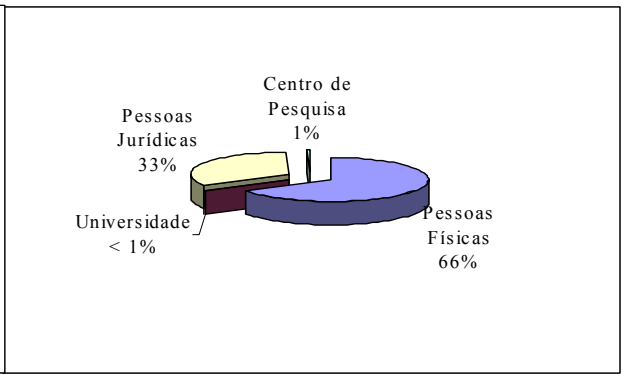



Figure 5. For segments of the society-1998 to 1996

In spite of the increase of the number of requests on the part of the universities in the last years, it's still very low the participation of this segment in the relative actions to the intellectual property. Emerick (2001) says that the reasons are:

- the research in Brazil began to be really incorporate for the main universities starting from 1968 with the Law of Guidelines and Bases. Nevertheless the academic research traditionally is characterized by freedom investigation, free flow of the information and popularization of the generated knowledge, not looking for necessarily something marketable or to assist to the market;
- the universities possess fragile hierarchical levels, presenting resistances to changes in several institutional instances hindering the relationship between the manager and the researcher;
- the universities don't possess regulations or politics institutional egg whites as the Intellectual Property and Transfer of Technology;
- the ignorance of the System of Intellectual Property takes to prejudices and misunderstandings (public X private; to publish X to protect); and
- the most narrow collaboration with the productive section is recent and it raises great philosophical and ideological discussions, in addition, the universities still meet quite deficient to work with the patents and negotiations

This context shows how much the national system of innovation of Brazil is fragile and the unknowledge about the intellectual property inside the universities. Then, it's necessary to stimulate and disseminate the intellectual property culture in the human resources formation specially in Engineering area.

## 6. Introducing intellectual property in mechanical engineering course

According to data of Ministry of Education, Brazilian undergraduate students are distributed in the knowledge areas as shown in Table 3. In Engineering, Production and Construction area there are 4.90 % of total of students.

Table 3. Undergraduate students for knowledge area

| **Area** | **% Students** |
|---|---|
| Education | 15,60 |
| Humanities and Arts | 31,74 |
| Social Sciences, Management and Law | 29,09 |
| Sciences, Mathematics and Computation | 6,04 |
| **Engineering, Production and Construction** | **4,90** |
| Agriculture and Veterinary | 1,53 |
| Health and Social Comfort | 10,03 |
| Services | 0,18 |
| General Programs | 0,90 |

In mechanical engineering courses – production mechanical engineering, industrial mechanical engineering and mechanical engineering – there were 4.454, 4.805 and 19.018 students respectively, totalizing 28.277 ones in 2003. Students that conclude the course there were 2.941 ones, respectively 489, 529 and 1923 as data of INEP. These are the future professionals that will be able to promote the technological development of Brazil in mechanical engineering area. For this, it's necessary to prepare them to do use of intellectual property instruments as competitive strategy.

This importance can be better understood based on a study made by INPI in the period 2000-2004. The survey of the Brazilians applications of the patents made hanging the profile of the inventor showed that mechanical engineering's applications have an expressive number of patents if compared with others applications area as shown Figure 6.

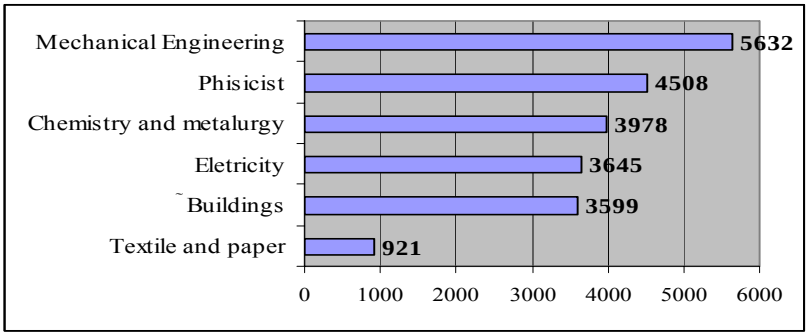



Figure 6. Number of patents for applications' area in Brazil

This survey shows the important place of the Mechanical Engineering in the patents' scenery, consequently to the technological development of the country. But it isn't sufficient to graduate mechanical engineers with solid technical formation. It's necessary that these engineers know how to protect the results of their knowledge and to use technological information included in patents' documents as an instrument of intelligence competitive.

Then the *curricula* of Mechanical Engineering courses must to broach the intellectual property theme. This can be done of many forms. Some suggestions are:

- to introduce the theme in Engineering Introduction matter with the objective of to touch the students about the strategic importance of intellectual property to his formation and to the technological development of Brazil
- to ask for to students to realize a research about a specific theme in patents data base to discover the state of technique
- to present to the students a problem and to ask for them to present a solution using intelligence competitive including patents documents
- in a matter that the students need to do a project – example, Machine Design or Final Project – to ask for a description of state of technique
- to ask for the students write a patent document about an invention of a new product or new process
- to promote seminars about intellectual property to disseminate the intellectual property culture

Nowadays many universities are creating Intellectual Property Centre. It's important that the mechanical engineering courses contact them to disseminate of intellectual property culture between students and teachers. The use of Intellectual Property knowledge can bring many benefits to the own students, to teachers, to the universities and to the country.

## 7-Conclusion

In Information Age or Knowledge Age the knowledge has become the new wealth. In this context Intellectual Property has been used in the strategy of companies, not only to protect themselves across patents, but also as a tool to strengthen their competitive edge, increase their sector influence and enhance their reputation as market innovators.

Across patents' documents is possible to protect the knowledge, monitor industry trends, find solutions to technological problems, explore investment opportunities, identify licensing opportunities, uncover new markets and market opportunities and others important information.

Engineering is a strategic area for the technological development of a country. Then the universities have the fundamental paper in to form human resources really prepared to act in a global world. However it is not enough to form engineers with solid technical formation. It is necessary these engineers also know about intellectual property for to protect the results of his knowledge and to use the technological information contained in patents' documents as instrument of competitive intelligence.

## 8-References


Assumpção, E., 2000, "Universidades Brasileiras e Patentes: utilização do sistema nos anos 90", INPI, Brazil

WIPO, 2005, "Intellectual Property: a Power Tool for Economic Growth", <www.wipo.int>

Cabral, U.Q., 2000, "Propriedade Intelectual", FGV/EPGE, Rio de Janeiro, Brazil

Porter, M.E., 1996, "What is strategy?", Harvard Business Review, V.96, n.6, 1996, p.61-78

Vedovello, M.C., 2000, "Sensibilização à gestão da inovação", class notes, CEFET/RJ, Rio de Janeiro, Brazil

Cruz, C.H.de B., 2000, "A Universidade, a Empresa e a Pesquisa que o país precisa", Parcerias Estratégicas, MCT, Brasília, Brazil, N. 8, p. 5-30.

Emerick, M.C., 2001, "Propriedade Intelectual e Comercialização de Tecnologia em Instituições Acadêmicas no Brasil", class notes, CEFET/RJ, Rio de Janeiro, Brazil.

Longo, W. P., 2000, "Educação Tecnológica no Mundo Globalizado", Rio de Janeiro, Brazil

Marcuzzo, O., 2003, "Brasil precisa transformar conhecimento em inovação tecnológica". SEMESP. São Paulo, Brazil

MCT ,2005, "Indicators of Science and Technology", <www.mct.gov.br>

Souza, C.G., 2001, "Avaliação da Competitividade Industrial com Base em Modelo de Hierarquia Fuzzy: uma proposta metodológica", COPPE/UFRJ, Rio de Janeiro, Brazil

Rivette, K.G. & Kline, D., 2000, "Discovering New Value in Intellectual Property", Harvard Business Review

INPI, 2005, "Patents Indicators", <http://www.inpi.gov.br>

Albuquerque, E. da M.., 2003, "Patents and Innovations Activities: a preliminary evaluation of Brazilian case". In: *Indicators of Science, Technology and Innovation in Brazil.* Viotti, E.B. & Macedo, M. de M. Unicamp Edit


## 9-Responsibility notice

The authors are the only responsible for the printed material included in this paper.