First Approach to Exploring Innovation Activity in Puerto Rico: a Patent-based Analysis from 1981 to 2000.

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Introduction

Patents reflect the current inventive and innovation development in modern technology. Patent activity analysis named patentometrics has become a valuable tool to identify main lines and trends of innovation, and, under specific conditions, it could be a way to know more details about the R&D process (Engelsman & van Raan, 1994). This study examines some aspects of Puerto Rico patenting activity over a twenty years time period, from 1981 to 2000.

Methodology

Source: Patents BIB database on CASSIS DVD-ROM (1969 to the present) from USPTO (United States Patent and Trademark Office). *Search strategy*: Normalized code of state [PR] (i.e. Puerto Rico) in the Inventor State field. The data set was segregated according to patent types: utility, design and plant patents as distinguished under USPTO. Utility patents were aggregated in various technological sectors using the scheme proposed by Hall, Jaffe, & Trajtenberg (2001). Notice that, according to Bhattacharya (2004) technological space that depicts the activity of a country under different technology sectors is mainly defined by the utility patents. That's why we have used only utility patents for the analysis and mapping of patenting profile. Correspondence Factor Analysis (CFA) was used to analyze and visualize a patenting profile of a twenty years period. (Doré, Dutheil & Miquel, 2000).

Findings

The total patents found with at least one inventor with residence in Puerto Rico were 505 for the period 1981-2000. We removed eight patents for incomplete data. The final data set included 497 patents. Figure 1, Table 1 and Table 2 depicts the characteristics of patent activity per sub-periods of four years each one. In Table 2 the increasing ratio respect to the first period has been calculated and presented in percent values.

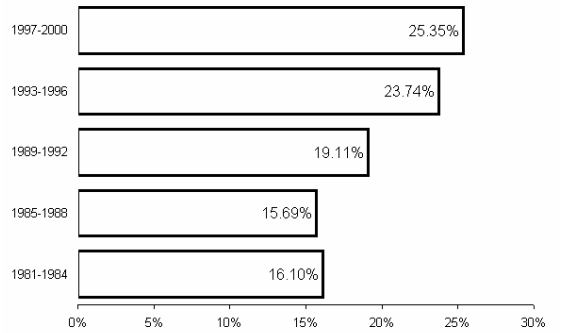

Figure 1. Patents distribution per sub-periods.

Table 1. Type of Patents.

Period	Utility	Design	Plant
1981-1984	75	5	0
1985-1988	63	15	0
1989-1992	80	15	0
1993-1996	100	16	2
1997-2000	107	19	0
Total	425	70	2
Total %	85.51%	14.08%	0.40%

The CFA of the matrix formed by thirty-six sub-categories and five sub-periods gave the results shown in figure 2 (Inertia of 69%). The variations between the time-points intervals when they are projected onto the first factor (horizontal) could reveal a turning point in patenting activity (Doré, Dutheil & Miquel, 2000).

Discussion

Results suggest a growing trend of patents granted from 1981-1985 to 1997-2000. This trend is especially remarkable in utility patents, which are the dominant type of patent in the profile. Trends in the six main sectors defined show a growing rate respect the first period for Chemical and Drugs & Medical sector comparing to more traditional sectors like Mechanical and Electrical & Electronic. The

category named Others account for most of the patents activity. It could be a reason to explain the central position in the map shown by some topics belongs to this category. The first three sub-periods,

Table 2. Patents activity in main sectors.

Categories	81-84	85-88	89-92	93-96	97-00
Chemical	5	6	20	16	16
	--	*20%*	*300%*	*220%*	*220%*
Computers & Communications	4	4	8	11	6
	--	*0%*	*100%*	*175%*	*50%*
Drugs & Medical	3	9	17	24	21
	--	*200%*	*467%*	*700%*	*600%*
Electrical & Electronic	25	13	13	19	19
	--	*-48%*	*-48%*	*-24%*	*-24%*
Mechanical	22	20	15	21	25
	--	*-9%*	*-32%*	*-5%*	*14%*
Others	40	32	42	45	52
	--	*-20%*	*5%*	*13%*	*30%*
Total	80	78	95	118	126
Total %	--	*-2.5%*	*18.7%*	*47.5%*	*57.5%*

1981-1984, 1985-1988 and 1987-1990 are associates mainly with topics related to Mechanical, Electrical & Electronics and Others main categories, meanwhile the last two sub-periods, 1993-1996 and 1997-2000 seems to be more closely related to topics associated with Chemical, Drugs & Medical and Computers & Communications sectors.

Conclusions

This research is only at the beginning, we can't make affirmative conclusions but preliminary findings are valuable to identify macro-trends in patenting profile. We believe that current and future results would be useful to Puertorrican decision-makers and other social actors in the government, industry or academia in order to improve and support accurate decisions. The systematic analysis of patent activity is a valid tool to know more details about inventive/innovative activity that is carried on in Puerto Rico.

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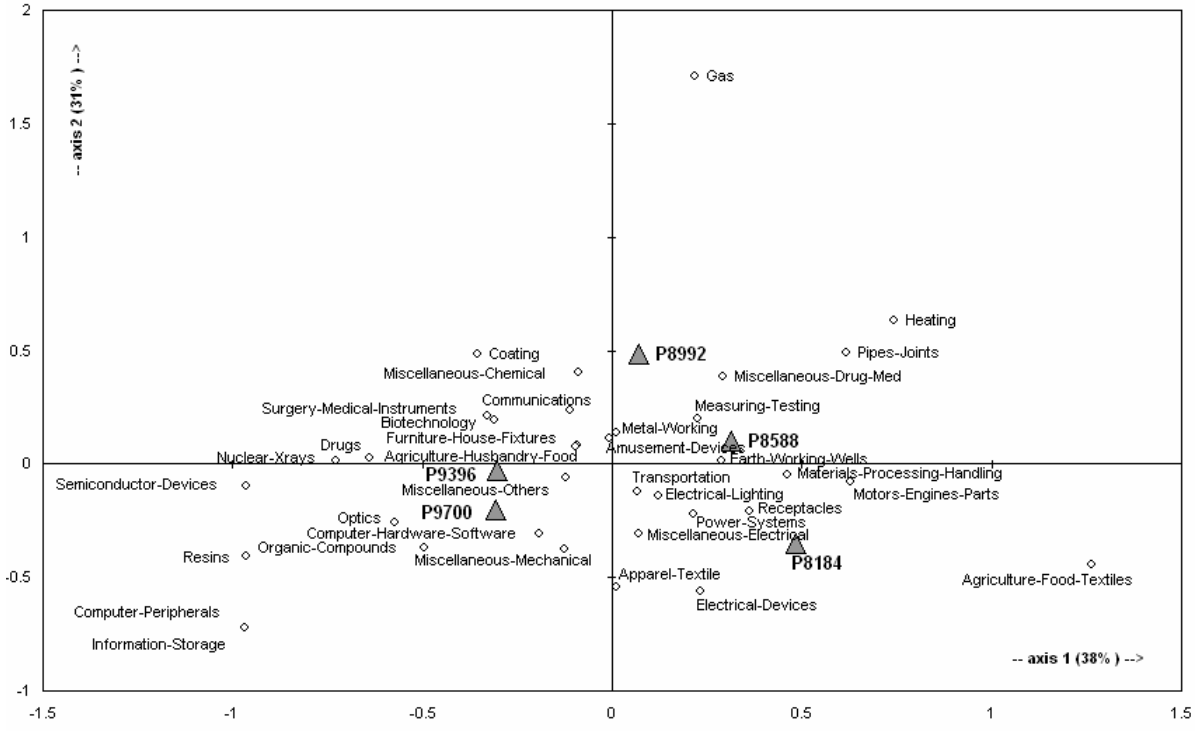

Figure 2. Patenting Profile Map (1981-2000 Utility Patents only

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