As the world economy becomes more interdependent and informatics costs decline, studies of informatics in developing countries have become increasingly important for reasons other than curiosity. This paper reports on a field study of informatics conducted in Uruguay. In addition to public and private sector analysis of interview and questionnaire data, we examine three infrastructure elements: telecommunications, education, and the legal system with respect to software copyright protection.

The term informatics is used globally as a synonym for information technology. Informatics in developing countries has been increasing in importance as the world’s economies become more interdependent and simultaneously increasing in availability as costs decline (Mody & Dahlman 1992). While studies of informatics in the developed world are becoming common, a look at the informatics sector in a developing country like Uruguay is relevant for reasons other than curiosity. In spite of the relative dearth of published information about informatics in Uruguay, the country has the potential to become a leading user of the associated technologies. Moreover, the experiences and lessons learned from an examination of supply and demand issues associated with Uruguay’s informatics sector can be applied to other developing countries.

The issues associated with informatics in advanced and developing nations have been addressed by many researchers. Recently, some researchers have taken a more regional approach to exploring the international perspectives associated with informatics. For instance, prior studies linking informatics topics and geographic regions include: developing countries (Sadowsky 1993), Africa (Janczewski 1992, Odedra et al. 1993), Paraguay (Goodman 1991), Brazil (Goodman 1992), and India (Dhir 1992, Nidumolu & Goodman 1993). Unfortunately, these reports have been largely anecdotal in nature.

This article describes various facets of the Uruguayan informatics environment. The following section provides a brief overview of the general business and economic conditions. Later sections provide more detailed views of the public and private informatics sectors as well as three infrastructure elements: telecommunications, education, and the legal system. The article concludes with a summary of the implications of the status of informatics in Uruguay.

**Economic, Geographic, and Demographic Profile of Uruguay**

Uruguay is a small country, dwarfed by its giant neighbors—Brazil and Argentina—that provide excellent business opportunities due to their large markets. The Mercosur agreement—a free trade association of Uruguay, Argentina, Brazil and Paraguay—will lower trade barriers such as quotas and import duties, among these four countries. Besides serving as a political as well as a geographic buffer between Argentina and Brazil (more developed than Paraguay), Uruguay is well positioned to take advantage of its competitive advantage within Mercosur (Hanna 1991). For example, Uruguay’s banking system has long been compared with the traditionally secretive Swiss system, making it particularly attractive to business firms in neighboring countries looking for stability and anonymity. This small nation is frequently used as a safe haven for political and economic refugees from other Latin American countries. The population maintains a
high literacy rate (95%) and consists of a large, conservative middle class (World Bank Atlas 1992). It is a particularly well-informed society boasting seven daily newspapers and ten political magazines in Montevideo alone. Although Uruguay has traditionally been an agriculture-based economy, the contribution of the service sector to the Gross Domestic Product—of particular significance to informatics—has grown in recent years, from 44% in 1970 to 58% in 1991. Table 1 provides comparative statistics.

### Research Methodology

In order to collect data on the current state of the informatics sector in Uruguay, we conducted several interviews; developed and collected data through a questionnaire to gather even more specific information; and consulted the amigocracia², the informal network commonly used to accomplish day-to-day bureaucratic activities in Latin America.

While in Uruguay, we conducted several interviews during May 1993 with: (a) the Head of the Informatics Department in the Office of the Presidency of the Republic, (b) the Informatics Manager for the Administración Nacional de Teléfonos (the state agency holding the monopoly on telephone services), (c) an advisor at the Comisión Nacional de Informática (CONADI), (d) the managing directors of two of the largest software and hardware vendors in the local market, (e) two computer science professors from the two universities, and (f) the managing director of the largest local insurance company.

The rationale for choosing this spectrum of interviewees came from the need to get a general picture of both the public and private sector informatics.

In astonishing contrast to more developed countries, almost no information was available in Uruguay’s public libraries, bookstores or newsstands. There are no specialized local publications, and only occasional newspaper articles. Secondary data sources also included: government reports, public reports prepared by the World Bank and other international organizations.

The interviews facilitated the development of a questionnaire to gather more specific information. We put together a list of just over one hundred names in public and private institutions, prepared from suggestions from the people interviewed and institutions mentioned in the literature.

Persistence rewarded us with forty-five completed questionnaires. Thirty-five of these respondents to the questionnaire were from the private sector, with the remaining ten from the public sector. The respondents in general showed a typical reticence to explain or document exactly what informatics tools they used and for what purpose these tools were acquired. They were far more communicative when it came to checking off boxes than in completing the free-text questions in the questionnaire.

In the next sections, the interview and questionnaire data will be analyzed. In addition to public and private sectors discussions, we will examine three infrastructure elements: telecommunications, education, and the legal system vis a vis software copyright protection.

### Evolution and Status of Public Sector Informatics

Current estimates place the number of public employees at 21% of the total work force of about 1.2 million. This large public work force results from inefficient staffing allocation among functions besides duplication of activities at almost all levels. For instance, all imported merchandise must pass through a dual customs system involving both the customs office and the Banco de la República—the national bank (World Bank Country Study 1993).

As far back as two decades ago, an awareness of the growing demand for informatics services in public administration prompted the government to create the Comisión Nacional de Informática (CONADI) - National Commission on Informatics. The objectives of the CONADI were to plan data processing activities for the public administration, control the use of existing mainframes and the information they held, and generally advise the President on matters related to informatics (Luna 1993).

The decree establishing the CONADI was subsequently revised several times. The latest, 1990 version (Presidential Decree No. 584/90) sought to encourage and promote, rather than restrict and control, the use of computer technology in the public administration. More specifically, the main objectives include: advising the President on a national informatics policy, promote the use of informatics throughout the government, prevent duplication of efforts in the development, operation and maintenance of computer systems, while insuring compatibility and exchange of information, promote activities towards the continuing education of informatics personnel, by organizing events geared towards analysis and exchange of information, promote the private sector’s involvement in hardware and software production, and serving

<table>
<thead>
<tr>
<th>Population (millions)</th>
<th>Area (thousands of sq. km.)</th>
<th>GNP</th>
<th>Adult Literacy %</th>
<th>Services as % of GDP</th>
</tr>
</thead>
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<tr>
<td>Uruguay</td>
<td>3.1</td>
<td>177</td>
<td>2,900</td>
<td>95</td>
</tr>
</tbody>
</table>

Table 1
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