If one wishes to identify the effects of information technology on organizational structure, strategy and performance, one must be able to characterize IT for operationalization purposes as a construct within a research framework. An initial requirement consists of developing and validating an instrument designed to measure an organization’s level of sophistication in the use and management of IT. A preliminary version of such an instrument was built to be applied in small manufacturing enterprises and tested with a sample of 101 organizations. The results of this study constitute a first step toward developing an understanding of IT sophistication and provide initial evidence for the reliability and validity of the proposed instrument.

Given the increasing complexity and uncertainty in their environment, small businesses are presently investing more and more in information technology (IT), hoping to obtain more productivity and greater effectiveness by this mean. Prior studies have shown that information technologies are starting to have an impact on the structural attributes (Raymond, 1990a), on the strategic choices (Miller, 1987) and even on the performance of small organizations (Bergeron and Buteau, 1988).

A fundamental problem facing IS researchers wishing to identify the effects of IT on organizations is the necessity of characterizing IT for operationalization purposes as an independent, dependent or moderating variable within a research model. There exists no recognized characterization of information technology in terms of its level of sophistication in organizations, and thus no validated instrument for use in empirical research and practice (Benbasat et al., 1984). Such an instrument should identify information technology’s fundamental dimensions and position the organization on each of these dimensions, thus establishing an IT sophistication profile and allowing for comparison between organizations (Raymond, 1988).

In this regard, small enterprises due to their greater simplicity in structural, strategic and technological terms (Mintzberg, 1979; Julien and Marchesnay, 1988; Raymond, 1990b) constitute a propitious terrain for initial study. Thus, a priori
identification of the characteristics which adequately describe IT use and management in this context is facilitated. The objective of this study is to take a first step toward an understanding of IT sophistication and the measurement of this construct in small businesses. Such a measure, when fully developed and validated, could be used by researchers for empirical studies and by practitioners for guidance and diagnostic purposes.

**From IS Evolution to IT Sophistication**

One of the first attempts at characterizing information systems was made by Nolan (1973, 1979) with his “stages of EDP growth” model. In the context of IT adoption by organizations, the evolution concept is used in identifying and planning the different stages of systems growth. One of Nolan’s objectives was to explain the relationship between a stage and the preceding or following stage. Importantly, this concept integrated not only the aspects related to IS usage (type of technology used, nature of the applications portfolio) but also those related to IS management (organization, planning and control of IS).

While the empirical validity of this model has been contested (Benbasat et al., 1984; King and Kraemer, 1984), and while it pertains to the evolution of organizational information systems, a fundamental concept was introduced in regard to the characterization of IS, i.e. the concept of the organization’s “IS maturity”. In Nolan’s model, the notion of IS maturity is closely related to IS evolution, maturity being defined as the ultimate stage of computing growth in organizations. IS maturity thus refers to a state where information resources are fully developed.

Following this, a number of researchers became interested in characterizing organizational information systems, and particularly in identifying different criteria of systems “maturity” or “sophistication” (Benbasat et al., 1980; Cheney and Dickson, 1982; Ein-Dor and Segev, 1982; Saunders and Keller, 1983; Gremillion, 1984; Lehman, 1985; Mahmood and Becker, 1985; Raymond, 1988). Most of these studies have used Nolan’s model as a theoretical foundation, and included criteria or “benchmark” variables approached from the two distinct perspectives of IS usage and IS management.

Among others, Cheney and Dickson (1982) investigated the relationship between what they defined as “technological” sophistication (hardware and software system, nature of application systems), “organizational” sophistication (information resource management activities) and system performance. One of their most important results was that user performance appeared to be very much influenced by organizational sophistication, but very little by technological sophistication. Also, within the IS usage perspective, some have distinguished between the characteristics of the technology itself such as the type of hardware and software tools found in the organization (Lehman, 1985), and the purposes for which this technology is applied (Raymond, 1988). In the latter case, Saunders and Keller (1983) referred to IS maturity as the “sophistication of the mix of applications provided by the IS function”, focusing more on the nature, content and structure of the information provided.

As to the IS management perspective, other researchers have distinguished between the characteristics of the formal infrastructure put in place to organize and manage the IS function (Ein-Dor and Segev, 1982), and the managerial practices employed to plan and control the systems development, operation and usage processes (Srinivasan and Kaiser, 1987). In the small business context, one can often find organizations where the formal IS function is non-existent, but where various IS management activities are nonetheless undertaken (Montazemi, 1987).

More recently, other studies have broadened the research domain from traditional IS with transactional and administrative applications to include, under the umbrella of “information technology”, the newer applications such as office information systems, CAD/CAM, computer-integrated manufacturing and electronic data inter-
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