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Research article

Local adaptations of generic application systems: the case of Veiling Holambra in Brazil

Marlei Pozzebon[1], Eric van Heck[2]

[1]HEC Montréal, HEC Montréal, Québec, Canada
[2]Department of Decision and Information Sciences, RSM Erasmus University, Rotterdam, Netherlands

Correspondence:
M Pozzebon, HEC Montréal, 3000, chemin de la Cote-Sainte-Catherine, HEC Montréal, Québec, Canada H3T 2A7.
Tel: +1 514 340.6754;
Fax: +1 514 340 6132;
E-mail: Marlei.pozzebon@hec.ca

Abstract

This paper focuses on local adaptations, referring to the significant or subtle changes local firms make in their local business processes and rules in order to fit with a generic application system, and to the changes they make in the features of a generic application system. Local adaptations are therefore bidirectional in nature. Although several studies stress the importance of local adaptations for the overall success of information technologies (IT) used across locations, more research is needed regarding what kind of local adaptations are required for a particular generic application system to work well in particular localities. The nature and extent of local adaptations are still poorly understood. This paper provides a concrete illustration of a historically situated local adaptation: the case of Veiling Holambra. This Brazilian cooperative has imported a generic auction marketplace model from Holland and adapted it to local conditions, to succeed in a globalized and competitive flower market. Using concepts drawn from studies on globalization, cross-cultural implementations, and IT-based organizational change literature, we put forward three propositions that help to explain the success of local adaptations. The results of our case study indicate that the immigration of Dutch people was critical for bringing knowledge of cooperative structure and flower production to Holambra and led to a relatively small design-use gap. The ability to take local, contextual requirements into account without neglecting the 'generic' knowledge led to the successful implementation of the generic auction model. This mutual influence was particularly enabled by the Brazilian culture of improvization.
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Introduction

Implementing information technologies (IT) across locations represents a huge challenge as it involves a dynamic process of negotiation due to differences between local work practices and those 'imposed' by the generic application system. By generic application systems we mean systems whose generalizable features may be divorced from the particular settings where they were conceived and applied more widely (Williams, 1997). They are often the result of years (sometimes decades) of research and development, and of multiple implementations, promising its adopters not only economies of scale but access to accumulated knowledge and improved business processes supposedly embedded therein. In the information systems (IS) field, generic application systems can be illustrated by configurable packages, such as enterprise resource planning systems, customer relationship management applications, clinical ISs packages, and other parameterizable artifacts, including

the computerized auction model that will be the subject of this paper.

Our focus is on processes of *local adaptations*, which refers to the significant or subtle changes local firms make in their local business processes and rules in order to fit with the generic application system they are trying to implement. However, since not all required changes are concentrated in the local dimension, these adaptations also refer to significant or subtle changes local firms make in features crafted into the generic application system. Such changes in the generic features are particularly necessary when there are certain requirements of local business processes and rules that have resulted from long-term learning and are likely to be preserved. Thus, although we use the term local adaptations, they are *bidirectional* in nature.

Several concepts have been applied to elucidate the interplay between a generic technology and a local context (Pozzebon, 2003). The concept of 'generic-local translation' refers to the process of adoption of configurable technologies wherein people have to translate 'generic' principles and multiple choices into 'local' contexts and requirements. This concept emphasizes the importance of local expertise and experience, including knowledge of the user organization and its methods and business context, which must be combined with more generic forms of knowledge, particularly of computing techniques and artifacts (Williams, 1997). People need to improve their capacity to address contextual characteristics and particular requirements in order to better implement and manage generic IT projects (Avgerou and Walsham, 2000). Although several studies stress the importance of local adaptations for the overall success of IT used across locations, more research is needed regarding what kind of local adaptations are required in order to have a *particular* generic application system work well in *particular* localities. The nature and extent of such local adaptations are still poorly understood.

This paper aims to fill the gap by providing a concrete illustration of a historically situated local adaptation: the case of a Brazilian cooperative, Veiling Holambra,[1] that has imported an auction marketplace model from Holland and adapted it to local conditions. The auction marketplace model uses an advanced computerized auction clock mechanism that was extended with online-bidding functionalities. We have addressed the following research questions:

- How was the auction marketplace model transferred from Holland to Brazil?
- What local adaptations of the generic application system were made and why?
- What factors could explain the success of these local adaptations?

We report a research case study carried out from 2003 to 2005 that investigates the efforts made by Veiling Holambra to develop and use the auction market concept for trading flowers in the national (Brazilian) and international markets. In line with Koppius (2002), we view auction markets not primarily as economic allocation mechanisms but as social structures. Markets are social institutions that facilitate exchange by means of competition. Their primary goal is to solve the problems of resource allocation (who gets what) and price determination (at which price).

In the next section, we present the theoretical framework and three propositions guiding this research. In the third section, we describe our methodological approach, based on a qualitative case study. The fourth section provides a historical account of Veiling Holambra, the role and impact of the computerized auction mechanism, and its emerging role in the flower industry. The fifth section offers an in-depth analysis of the successful development of the Holambra auction model borrowed from European experiences and adapted to the Brazilian context. We summarize the nature and amount of local adaptations people have carried out and how they have implemented them. Finally, in the last section we discuss theoretical and practical implications.

Theoretical approach

Local adaptations have been emphasized as a critical factor in the consideration of the high rate of failure of IT projects in firms, particularly those located in developing regions (Avgerou and Walsham, 2000). The investigation of the nature of the process wherein generic and local are negotiated has been suggested as a fruitful area for research (Swan *et al*., 2000; Rolland and Monteiro, 2002). We need to improve knowledge on what kind of local adaptations are required for generic IT to work well in particular localities. In order to investigate the nature and degree of generic-local translations required for making a generic application system a locally workable solution, we have articulated concepts from several studies on globalization, cross-cultural implementations, and IT-based organizational change literature. In the next sections, these concepts are discussed and three propositions are formulated.

Literature on cross-cultural implementations: the design-use gap

The 'tool' view of technology, pointed out as dominant in IS research by Orlikowski and Iacono (2001), is a perspective that posits technology as a neutral engineering artifact, viewed independently of the social or organizational arrangements within which it was developed, and expected to do what its designers intend it to do. One of the main consequences of the tool view is that it 'black boxes' technologies, treating them as monolithic constructs, easily transferable, unproblematic, and stable devices that can be passed from hand to hand and used as is, by anyone, anytime, and anywhere. On the other side, we found a number of researchers, like those aligned with the extensive sociotechnical literature (e.g., Land and Hirschheim, 1983), portraying IT as social and political artifacts, designed, built, and applied by people who have interests, values, assumptions, and whose perceptions and interconnections with IT depend on their particular contexts and circumstances, their culture, and their society (Brown, 1998; McLoughlin *et al*., 2000).

Viewing the interconnectedness of physical features and social practices as particularly relevant for cross-cultural IT implementation, Heeks (2002) defines the *design-actuality gap* as a mismatch between current requirements and characteristics of a local organization and the embedded system design conception of a generic technology. The

author argues that, in the context of IT implementations in developing countries, the contexts of 'designer' and 'user' are often distant in physical, cultural, economic, and many other ways, and the design-actuality gaps are likely to be more extreme and more explicit.

Adopting the expression *design-use gap* as more appropriate, we believe that in a globalized world where migration movements have been intense in recent centuries, cultural, institutional, social, and political differences are as important as differences in terms of degree of development. Studies of cross-cultural implementations from many parts of the world could form the basis for comparisons and inferences from a global and relevant viewpoint (Avgerou and Walsham, 2000). We espouse such a belief, and we propose that a qualitative evaluation of the design-use gap is fundamental for any analysis of the successes or failures of local adaptations. This includes efforts at learning more about the history, culture, social relations, and local competencies – not only from the perspective of the 'designers' but also especially from that of the 'adopters'.

An example of the design-use gap can be drawn from an experience in the Philippines, where an aid-funded project to introduce a field health IS was designed according to a Northern model that assumed the presence of 'skilled' programmers, 'skilled' project managers, a 'sound' technological infrastructure, and a need for information outputs like those used in an American health-care organization. In reality, none of these elements were present in the Philippine context, and the IS project failed (Heeks, 2002). Technologies developed and implemented in one culture may fail when taken to a different setting (Avgerou and Walsham, 2000). Above all, the transfer of technologies across locations presupposes cultural acceptance. It requires openness to the complexities of specific cultural contexts and the way in which these affect the process of IT implementation (Walsham, 2000). This leads us to formulate our first proposition (P1):

> The success of generic application system projects is likely to increase if the design-use gap is taken into account. The smaller the design-use gap, the easier the nature and effort of local adaptations.

The global–local debate: a mutual-influences perspective

We could not discuss cross-cultural implementations without also looking at the literature on globalization. A variety of approaches and passionate debate have surrounded the globalization phenomenon, a contradictory process that implies increased interconnectedness among local actors as well as 'globalism' in the form of increased transnational uniformity (Beck, 2000). Such intensification of worldwide social relations links distant localities in such a way that local developments become a function of events occurring many miles away, and *vice versa* (Giddens, 1990).

In the global–local debate, polarized arguments characterize both those who believe in the inevitability and suitability of a process of cultural 'homogenization', that is, the widespread adoption of proven policies, objectives, and practices proposed by wealthy regions of Europe and North America, and those who defend cultural 'diversity'. Regarding the *homogenization stream*, the underlying argument is that, despite the differences between rich and poor regions, they have similar social arrangements and structures. This belief generates pressure on all countries to adopt common policies, objectives, and practices (Bada, 2002). The resulting standardized solutions are portrayed as beneficial (Rolland and Monteiro, 2002). A typical example of the diffusion of homogeneous global patterns is the use of the credit card as a unified world currency. From this perspective, IT represents a privileged medium of homogenization. By providing ever-narrowing approaches to organizational and social problems (standardized solutions with embedded best practices, online connections requiring uniform protocols), IT may provoke a selection process that is likely to reduce diversity in human society, tracing a path of deterministic 'convergence' (Sagi *et al.*, 2004).

The *cultural diversity stream* is not optimistic about such cultural homogenization or convergence. Exponents refer to 'cultural imperialism', that is, large-scale transfer of meaning systems and symbolic forms from the center to the periphery, producing very negative effects on local cultures, 'erosion of local cultures', and practices by 'commodified' Western cultures (Bada, 2002). Researchers celebrating diversity do not see globalization as a monolithic or homogeneous process. Rather, because enormous cultural diversity exists and resists, global trends would be appropriated differently by different countries, and such diversity would influence the total phenomena of globalization (Walsham, 2000). From this perspective, the challenge for IT academics and professionals is to consider how best to support diversity, which requires a greater sensitivity to local norms, values, and ways of doing things. This involves not underestimating local knowledge and capabilities (Walsham, 2000).

As is often the case, an *intermediate position* between homogenization and cultural diversity exists, one that sees global and local not separately or in opposition, but in terms of an interactive 'mutual-influences' approach (Held *et al.*, 1999). Here, the relationship between global and local cultures is a two-way relationship in which localism is not about to be lost to a universal process such as globalization, and universalism is not about to neglect particular processes (Robertson, 1992). A reciprocal interaction takes place in which the local is infused with the global, and *vice versa* (Held *et al.*, 1999). 'The existing culture of a country will mediate globalization processes in particular ways in specific contexts and, in turn, this will contribute to the complexity of globalization as a totality' (Walsham, 2000: 291).

Accepting mutual influences means taking generic or global knowledge (or practices or models) into account but carefully adapting them to local specificities or contingencies. Such local adaptation will, in turn, invite generic models to incorporate at least part of the changes or innovations suggested in new versions and upgrades. The second proposition (P2) is expressed as follows:

> The success of generic application system projects is likely to increase if a mutual-influences perspective is adopted, i.e., taking local, contextual socio-cultural requirements into account without neglecting the "generic" knowledge (what people have already learned worldwide).

Particular processes of local adaptation: 'improvization' as a cultural mark

Accepting that a qualitative assessment of the design-use gap is viable and that a mutual-influences approach may be beneficial implies that, once an appropriate generic IT is selected, people in particular local contexts need to engage in local adaptations and change technological features to ensure that the final configuration is workable and fits with their needs and demands. However, different cultures will engage differently with local adaptations. In order to better understand local adaptations, we should understand the *particular ways* in which people engage with them as they are likely to be culture-dependent. Regarding the Brazilian case, we found in the concept of *organizational improvization* insightful explanations for the particular adaptations we will describe in the next sections.

The concept of 'improvization' has drawn the attention of several researchers investigating IT-based organizational change (Orlikowski, 1996; Ciborra, 1999; Bada *et al.*, 2004). For instance, Orlikowski (1996) focuses our attention on the unintended consequences of IS introduction in organizations, drawing on daily experiences and interactions where improvizations represent attempts to make sense of, and adapt new technologies to, their particular settings. Improvization may emerge for several reasons: from emergency situations or crises (Weick, 1993); in response to managing unexpected opportunities or breakdowns during the process of implementing change (Orlikowski and Hofman, 1997); from unexpected action rooted in intuition and aimed at resolving particular situations or crises (Silva, 2002); and from intentional actions, intuition, and sensitivity to everyday practices and experiences, or what Ciborra (1999) calls 'smart and competent improvizations'.

Silva (2002) has argued that improvizations are frequent in firms of developing regions because of the less stable political and economical environment, and this is valuable for understanding the Brazilian context. However, a variety of other cultural aspects should be taken into account. For example, ambiguity is seen as an essential trait in Brazilian culture. 'In Brazil nothing is what seems to be, and when it is what it seems, it can also be something else. To deal with this ambiguity, Brazilians disguise it as flexibility or adaptability' (Caldas and Wood, 1997: 7). A typical manifestation of this quality is the well-known 'Brazilian way', or '*jeitinho brasileiro*', which means that there is always a way of solving problems that is not expected or institutionalized. The 'Brazilian way' comprises all social practices that attempt to find a way around rules and, according to many authors, it constitutes a social strategy to soften the impersonal forms that govern Brazilian personal relations (DaMatta, 1989; Barbosa, 1992). This awareness of cultural particularities in terms of social strategies and recurrent and purposeful improvizations leads us to formulate a third proposition (P3):

> The nature of local adaptations can vary from one culture to another, and people engage in local adaptations in different ways. The success of generic application system projects is likely to increase if culturally-dependent local adaptations take place. In the context of Brazilian culture, recurrent and subtle improvizations have positively influenced local adaptations.

Research methods

In this research, we have adopted a qualitative case-based approach, which has been suggested as one of the most appropriate research strategies for conducting empirical work in process-oriented research (Glesne, 1999). We have followed Stake's (1998) concept of the instrumental case study: a particular study that is examined to provide insight into a research issue. The case – the Brazilian cooperative Veiling Holambra – was selected based on practical concerns of access and timing as well as on theoretical concerns: it has unique and rare characteristics (Eisenhardt, 1989) in that it represents a recent and successful adoption of a generic technology. Veiling Holambra provided an opportunity to investigate the implementation of a generic IT in a local setting and thereby understand the extent and nature of local adaptations put in place in order to make the IT work well. One of the advantages of case-based research over other methodologies is the opportunity to use multiple sources and types of evidence to achieve triangulation (Glesne, 1999).

The main sources of data are archival research and interviews. From 2003 to 2005, we had access to a huge number of archival documents from which we learned about the past history and current context of Holambra. In addition to archival research, three types of interview were applied: face-to-face, phone, and e-mail. Interviews by phone and by e-mail were carried out periodically from April 2003 to December 2004 with Holambra managers and one regional consultant in the flower market. Face-to-face interviews were conducted in January and September 2005. In January 2005, a first visit and set of face-to-face interviews with Holambra managers lasted a total of 6 h. However, these discussions were not tape-recorded, as the organization had forbidden it. The interviewer wrote a summary from notes taken during the interview, including quotes or near-quotes. The second face-to-face interview with one Holambra manager occurred in September 2005, lasted 2 h, and was tape-recorded.[2]

Regarding data collection and analysis, a *historical approach* was adopted. Such an approach offers a valuable perspective for understanding contemporary problems, how they arose, how their characteristics unfolded, which solutions have worked, which have not, and why (Mason *et al.*, 1997). In terms of historical methods, we followed six steps, as suggested by Mason *et al.* (1997). After (1) identifying our research questions, we (2) specified the domain of inquiry with well-defined spatial and temporal boundaries. In our case, the primary unit of analysis is an individual cooperative, called Veiling Holambra, located in the state of São Paulo, Brazil. Regarding the period being investigated, four phases were identified. Although phases 3 and 4 constitute our target period, the preceding historical period (1948–1998) was also important for understanding the context:

- Phase 1: Settlement of Dutch immigrants in Holambra and introduction of flower cultivation (1948–1988).
- Phase 2: Establishment of cooperative structure at Holambra (1989–1998).
- Phase 3: Introduction of computerized Dutch auction clock model (1999–2002).

- Phase 4: Introduction of online bidding in the auction market (2003–present).

The adoption of a historical approach involves (3) the gathering of extensive documents and written records. Our data collection included academic and professional papers, articles in the media, unpublished theses, historical documents, local news available on the Internet, organizational documents, annual reports, trade association studies and pictures, in addition to transcripts from exchanged e-mails, phone calls, face-to-face interviews with Veiling Holambra managers, and research notes from visits to the actual site. As suggested by Mason *et al.* (1997), we carried out a (4) critical evaluation of the empirical material, using analytical processes like basic logic, determining the credibility of sources and assessing the overall coherence of documents. One advantage of conducting historical studies of recent phenomena is that we can contact the living participants by e-mail or phone and clarify items in dispute.

The (5) data analysis was essentially deductive–inductive. The initial analysis was guided by the first two propositions. Nonetheless, the existence of initial propositions has not precluded the emergence of new propositions. For instance, the analysis of Proposition 2 leads us to integrate an additional theoretical frame, specific to electronic models, and to the formulation of Proposition 3.

Finally, we (6) wrote up the history and the conclusions. 'Stories that tell the history are always biased; none can ever document the truth' (Denzin and Lincoln, 2005: 375). In order to increase the validity of our historical narrative, we sent a draft of the Veiling Holambra business case to Holambra managers in order to have their signed approval. It was approved by them in August 2005.

The case of veiling Holambra

Settlement of Dutch immigrants and introduction of flower cultivation (1948–1988)

The Holambra area was settled by immigrants to Brazil from the Netherlands. After the devastation of World War II, the Dutch government encouraged emigration, mainly to Canada, Australia, France, and Brazil. On June 15, 1948, the Brazilian Minister for Colonization Affairs signed an agreement offering 5000 ha, in an area located in the countryside of São Paulo, for settlement by Dutch farmers. After 1 month, the leader and author of this immigration project, Mr. Gert Heymeyer, officially opened exploration and colonization activities. The name HOLAMBRA was created based on the letters from 'HOLland, AMerican continent and BRAzil'. Upon their arrival in Brazil, the immigrants began to plant different types of vegetables and fruits. In 1951, 3 years after the arrival of the immigrants, the community hesitantly began planting flowers, unsure of whether flower cultivation would prove profitable. However, between 1958 and 1962, the flower business expanded rapidly and became the main activity of the region. In 1972, individual growers began to coordinate their efforts, aiming at the sale of a wide variety of ornamental flowers.

Establishment of a cooperative structure at Holambra (1989–1998)

The Veiling Holambra Cooperative is the leading flower company in South America and was formally established in 1989. The cooperative occupies an area of 92,000 m^2. It handles transactions involving more than 40% of the green plants and flowers traded in the Brazilian market, making it the sixth largest market in the world, with total trade growing at an average rate of 22% a year and revenues of US$42.1 million in 2004. As a trade center, it maintains relationships with wholesalers and supermarkets. Its 433 current customers, spread across all five Brazilian regions and throughout South America, distribute Veiling products to more than 20,000 retailers – garden centers, supermarkets, and flower and decoration stores. Veiling Holambra integrates the production of around 279 supplying growers, associated or non-associated producers of the cooperative, established mainly in the Holambra region. Overall, these suppliers cultivate a wide range of products encompassing more than 500 flower and green plant species in more than 3000 different varieties. Today, with a population of approximately 10,000, Holambra City is known nationally and internationally as the 'City of the Flowers'.

In 1989, when producers formally joined together in the Veiling Holambra, their basic goal was to create a marketplace where the output of small producers would be gathered in a single market center, thus increasing their bargaining power with buyers. Above all, Veiling Holambra has a cooperative organizational structure owned by the growers. Some of the benefits growers receive from participation in a cooperative system are access to new buyers, fiscal benefits, incentives for competitiveness and innovation, greater financing ability to leverage operations, and institutionalized capability to communicate within the business environment. The main gain is for the smaller producer, who can enter the market with a limited investment. As a group, small producers increase their bargaining power.

The implementation of an auction model started with the beginning of the cooperative, in 1989. However, in that early period, Veiling Holambra did not have the financial resources necessary to purchase an electronic model. They organized the first auction marketplace using local infrastructure. As described by one Veiling Holambra manager:

> *"We put several lamps in the wall, we made connections, we brought some chairs. We invited the clients and we made some labels with numbers, each client with a number. (…)With the lamps in the wall and plug-ins in the chairs, we started. For each number, there was a corresponding lamp in the wall and a client sat in the chair. We invited two experts in the flowers market and we installed a microphone. We divided the existing production in lots and organized the first auction. The one who lit the lamp first, got the product. And this worked!"*

They implemented a 'descending auction model', based on a Dutch model. The Dutch model (explained in detail in the next section) was created in the 1870s by a Dutch shipper looking for a better and simpler way to sell flowers

(Kambil and Van Heck, 2002). Despite the precarious infrastructure, the improvized auction model worked so well that after a few months Veiling Holambra decided to buy its first clock. The first clock was an old model, no longer used in the Netherlands. More modern chairs adapted for the auction were also purchased. With the success of the auction model and the continuous increase in flower production and sales, Veiling Holambra managers decided to buy their first digital or electronic model.

Introduction of computerized Dutch auction clock method (1999–2002)

The electronic clock model[3] was imported from the Netherlands Flowers Trade Centers in 1999, and it too was based on the descending auction model. Contrary to the well-known English auction model, the 'Dutch auction' method starts at a high price level set by the auctioneer – a level at which the product would be considered very expensive and unlikely to be sold. The price then drops progressively, until a buyer signals the auctioneer that he or she will take the product at the current price. The auction clock ticks downward – indicating the price of the flowers per stem – until a buyer stops the descent by pushing a button or clicking the mouse of his computer. The buyer can buy part of the lot, in which case the remainder of the lot is auctioned again. The Dutch auction system creates a competitive atmosphere since the first buyer to push the button gets the deal. As the announced price progressively drops, the buyer may stand to get the flowers at a lower price, but may also lose them to another buyer who stops the clock first. The Dutch auction method is an efficient means of determining the price of flowers and their allocation among buyers. In this trading system, the products are delivered by suppliers every afternoon, accompanied by identification of product, producer, quality, and quantity. From that moment on, the product is available for customer inspection. At 0630 hours on the following day, the data on each product is fed into a central digital screen that can be viewed by retailers and distributors at Holambra or from their own offices via an application provided by Veiling Holambra.

Veiling Holambra has two clocks that operate simultaneously, auctioning two types of flowers. As soon as the client pushes the button, a sales tag is generated and placed on the product sold; within minutes, the lot is carried to the client's truck, which is parked at the Veiling platforms. The clock auction method is supply-driven and responsible for 52% of the total sales, the remaining 48% being traded via the demand-driven Veiling Brokers department. Moreover, the 'clock' is a fundamental logistical tool for competing by price against international flower traders in real time.

> *"The clock auction tremendously improved overall logistical agility. Veiling Holambra sells 6 batches per minute and there is a perfect relation between demand and supply. Moreover, this system provides an enormous quantity of sales information regarding seasonality and average prices per period, per buyer and per producer. Veiling Holambra now has more information than it can process"* (Veiling Holambra manager).

Regarding the adoption of the electronic clock, a group of counsellors of Veiling Holambra (Dutch or sons of Dutch immigrants and original members of the cooperative) were already familiar with the model and strongly influenced the decision to buy it. Veiling Holambra created a new department responsible for all steps of the implementation project for the new system. The global IT supplier – Aucxis with its wholly-owned subsidiary Schelfhout Computer Systemen – provided the basic guidelines for installing the physical components of the system, but no external or foreign consultant worked on the project. All the parameterization were carried out by the Holambra team. The global IT supplier is an e-business service provider to perishable commodity marketplaces and facilitates more than 125,000 transactions per hour in more than 100 e-markets worldwide. Aucxis is headquartered in Toronto, Canada and has operations in North America, Europe, and Australia. The implementation lasted 1 year, if we take into account the testing period. Modeled on a system already successfully implemented in the Netherlands, the 'veiling' system's adoption did not occur without important 'adaptations' to local conditions, carried out entirely by Brazilian people designated by the project. These successful local adaptations corroborate the view that beneficial effects are likely when 'mechanistic' adoption of foreign technologies is avoided and careful attention is paid to local requirements and conditions.

Introduction of online bidding in the auction market (2003–the present)

In 2003, the volume of flowers traded by Holambra was approximately 15 times what it had been in 1989, equivalent to an average annual growth rate of 21%. In order to maintain excellent yearly growth, external markets outside Brazil became fundamental to Veiling Holambra's goals. By 2003, Veiling Holambra was already exporting to Europe and the United States, and importing, mainly from the Netherlands, to meet Brazilian market demand for products not cultivated in Holambra.

> *"The exports from Veiling Holambra began in 2003 because of converging factors such as the depreciation of the Real (Brazilian currency), growing demand in Europe for tropical flowers and increasing investments in web interfaces to reach outside buyers through distant selling systems. However, it would take at least 2 or 3 years to consolidate export volume, become less dependent on the devaluated currency, and become truly competitive in the international environment. But it is certain that the international market holds huge potential promise"* (Brazilian consultant in the flower market, January 2004).

Since its foundation, Veiling Holambra has been known as an implementer, not a developer, of IT. Holambra 'imported' know-how, mainly from the Netherlands. However, in the last couple of years, Veiling Holambra has begun to gain international recognition as an important IT developer in this industry, especially in proposing additional tools for the original model. For example, an additional tool for the clock auction system was specially designed at Veiling Holambra for distributors and overseas

importers who are unable to participate in auctions in real time. This tool, called 'pre-offer' or 'proxy-bidding', is a web-based application provided by Veiling Holambra to its clients in which the distributor anticipates its offers for different products, specifying quality, quantity, and price. During the auction, when the price reaches the pre-offer set by the client through the Internet, the sale takes place.

For Veiling Holambra, the implementation of such an online auction concept was intended to create a Web channel for customers who were far from Holambra. Buyers could bid online to the same auction clock being used by the buyers sitting in the auction halls at Holambra. For buyers, the potential benefits of the online auction model were easier access to the Holambra auction market and lower traveling costs. For flower growers, introducing the online auction model could create a wider customer base, increasing competition among buyers, and thereby driving up the prices of flowers offered. Veiling Holambra's strategy was to enlarge their market share by accessing buyers in more distant regions of Brazil as well as other countries in South America, the United States, and Europe. Although the volume of online transactions is still low compared to physical transaction (where buyers are physically present for biding), Veiling Holambra's objective is not only to strengthen its leading position in the South American flower industry but also increase its presence in the international markets. In 2005, Veiling Holambra was exporting its flowers to the US, the Netherlands, Portugal, Canada, England, Uruguay, Argentina, and the United Arab Emirates.

Analysis

Evaluating the 'design-use' gap: is it big or small?

Our first proposition maintains that 'the success of generic application system projects is likely to increase if the design-use gap is taken into account. The smaller the design-use gap, the easier the nature and effort of local adaptations'. Therefore, our analysis starts with a qualitative evaluation of the design-use gap in terms of cultural, social, institutional, and historical comparisons between the generic IT model imported from Europe and local IT model as implemented at Veiling Holambra. The region of Holambra illustrates a common situation in Brazil and other countries: the presence of intense immigration. Over a hundred years of huge immigration (particularly between 1850 and 1950), a myriad of people and races transformed Brazil into a rich blend of cultures. This mixture precludes any simplistic or monolithic analysis.

The immigration from the Netherlands in 1948 deeply marked the region of Holambra. During an interview conducted in 2003, Holambra's mayor stated that the main reason why Holambra City was able to achieve above average results on the quality of life indicator was that, since the settling of the Holambra area in 1948, farmers and their families have overall implemented a superb sense of organization towards common objectives, and developed processes, technologies, and expertise in a common direction to succeed as a community, as a city and, eventually, as a business that now supports the city, creating a powerful cycle of sustainability. This suggests that both cooperative culture and technological innovation had a strong influence on the trajectory of the city of Holambra and the Veiling Holambra firm.

Analyzing the history of Holambra, we cannot ignore the strong influence of the Dutch immigrants and their descendants in providing knowledge of flower production, in creating bargaining power among growers by introducing the concept of the 'grower cooperative', and in trading perishable products and introducing a high-speed negotiating mechanism, the Dutch auction clock. Without these key elements – *flower-producing knowledge*, *cooperative concept*, *auction model* – the entire economic process of creating a dynamic flower industry in the region would have been very difficult and slow, if it had taken place at all. This whole context served as a solid foundation for the adoption and implementation of a particular model – the auction marketplace model – supported by an intensive use of IT applications: computerized clock, web-based proxy-bidding, multimedia stations available for clients at Veiling Holambra, extranet for producers and clients, EDI, etc.

The introduction and implementation of the generic auction system by Veiling Holambra was considered successful by all stakeholders involved. By linking online to distant buyers, the flower growers in the region create sustainable growth in the flower trade for the near future. The success of the system can be explained partly by local adaptations that were carried out, described in the next section, but is due mainly to the narrow design-use gap between local (Veiling Holambra) and generic (original Dutch model). The decision of adopting the Dutch model was made by the older members of Holambra, Dutch descendants, who were familiar with the underlying logic of this model.

> *"We have in our executive team several sons and grandsons of Dutch immigrants and this helps politically and also regarding the language (…) They already knew the veiling systems of Holland, Germany and Belgium. They were very familiar with it".* (Veiling Holambra manager).

In the one hand, we currently found in Holambra a mix of different races and cultures that is a cultural feature of Brazil. Holambra is a blend of cultures: Dutch descendants mixed with descendants of other cultures as well as with 'pure' Brazilians (descendants of a mix of native aborigines, Portuguese and Africans). So, Holambra no longer represents a 'pure' Dutch community. On the other hand, the Dutch influence at the moment of the adoption and implementation of the auction model were strong, reinforcing the assumption that design-use gap was relatively small. We posit this small gap as one of the influential factors that help explain the success of the adoption of a generic application system by Veiling Holambra.

> *"A group of older producers did not want to lose all the work carried out by their parents [the original Dutch immigrants]; they decide to change the existing structure. "We are going to implement the Dutch model. If we go right, we will grow, if we go wrong, we will break down".* (Veiling Holambra manager).

Analyzing global–local balance: what local adaptations were made?

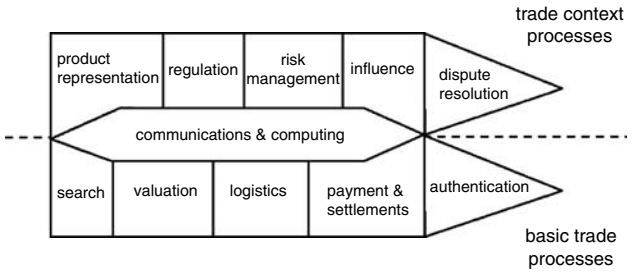
Our second proposition is that 'the success of generic application system projects is likely to increase if a mutual-influence perspective is adopted, i.e., taking local, contextual socio-cultural requirements into account without neglecting the 'generic' knowledge (what people have already learned worldwide).' To evaluate this proposition, the analysis of the nature and extent of local adaptations carried out during the implementation of the auction model was organized into two parts. First, because we are not dealing with an abstract IT application, but with a well-defined computerized auction clock model with on-line-bidding functionalities, we decided to select an appropriate framework for analyzing this type of market-place model. We retained the process-stakeholder benefit framework as developed by Kambil and Van Heck (1998, 2002). Such a framework was initially developed in the context of Dutch flower auctions, but it was further applied and improved in other industrial, social, and cultural contexts, such as the African–European flower business (Cunden and van Heck, 2004), and beef markets in Australia (Driedonks *et al*., 2005). Second, we benefited from the historical narrative in complementing additional aspects of the process of local adaptations.

Applying a process/stakeholder framework for identifying local adaptations

The framework identifies five basic trade processes (search, valuation, logistics, payment and settlement, and authentication) and five trade context processes (product representation, regulation, risk management, influence, and dispute resolution). Figure 1 presents the main processes proposed by the framework. The IT infrastructure (Internet communications and computing) makes it possible to integrate all trading processes to support buyers and sellers.

The underlying logic of this framework is that trading is a social activity in which both buyers and sellers want to feel that a fair and equitable outcome awaits them. All players should perceive they will have a net benefit from the implementation of the model. The basic trade processes are distinct processes that are required in all goods or service transactions. The trade context processes facilitate or enable or reduce the costs of, or 'friction' in, the basic processes. Trade context processes, therefore, support the creation and maintenance of trust and confidence. Trust is the willingness of a buyer or seller to rely on the other with confidence, to believe, in other words, that the other will fulfill his or her obligations. The key basic and context processes allow systematic identification of processes affected by the adoption of a generic application, for example, the online auction market model. The adoption, implementation, and operation of IT applications create costs and benefits for different stakeholders in the exchange.

We have applied the process-stakeholder benefit analysis by focusing attention on critical features of local adaptations of the generic auction system, taking into account online capabilities in addition to the computerized auction concept. We critically examined how the adoption of the generic online auction concept was implemented, and for which processes and stakeholders local adaptations were made (Table 1). We analyzed both the significant and subtle changes Veiling Holambra made in its local business processes and rules in order to fit with the generic auction system. We also looked for significant or subtle changes that Veiling Holambra made to the generic auction system itself, in order to fit with the requirements of local business processes and rules.



The processes related directly to executing a trade of any kind include:

- Search processes that allow buyers and sellers to discover and compare trading opportunities.
- Valuation processes to help buyers and sellers set prices. A variety of different price discovery and bidding processes, such as auction methods, exist that enable buyers and sellers to discover prices of goods or services.
- Logistics processes coordinate the transfer of physical and digital goods between buyers and sellers.
- Payment and settlement processes to transfer funds from buyer to seller. Third parties, such as banks, provide the infrastructure for these exchanges processes.
- Authentication processes to verify the quality of the goods sold and the credibility of the buyers and sellers. Authentication may involve third parties who provide credit check, notarization and other services to reduce the uncertainty of buyers and sellers.

Five additional trade context processes enhance trust among trading parties and legitimize the trading. These include:

- Product representation processes that specify the presentation of products and services to buyers and sellers. Both the buyers' and sellers' costs are reduced by informational standards or well-specified languages to represent the key quality, functional, or aesthetic attributes of the product.
- Regulation processes record and recognize the transaction within a framework of laws and rules to signal it as legitimate and conforming to a set of market rules and social principles.
- Risk management processes to reduce buyer and seller risks in a transaction. Risk management services insure transactions and provide information to help the buyer and seller with price, delivery , theft, and other risks.
- Influence processes to ensure that commitments among trading partners are met.
- Dispute resolution processes that resolve conflicts among buyers, sellers and intermediaries such as auction houses. Firms may elect to settle disputes through direct negotiation, or commit to third-party arbitration or court resolution of disputes.

Figure 1 Basic trade processes and trade context processes (Kambil and van Heck, 2002).

Adaptations in local trade processes

As Table 1 indicates, several stakeholders made subtle changes in their local trade processes. First, from the flower growers' perspective, they had greater responsibility in the influence process, due to the use of producers' data in the contract with buyers. Flower growers also had to adjust, as they were asked by Veiling Holambra to work with forecasts based on online auction data. They were also asked to invest in computers for their facilities because all the information is exchanged in real time, using an Extranet. According to a Veiling Holambra manager 'it was very hard for small growers. They had to invest a lot not only to improve the quality of their products but mainly to improve their information processes'. Second, from Veiling Holambra's perspective, auction speed in the pricing process was fine-tuned, due to the fact that the online auction system had to be in sync with the offline auction clock. Veiling Holambra also used online auction

Table 1 Detailed analysis of local adaptations of the generic auction system

Trade processes	*Flower growers*	*Holambra auction*	*Flower buyers*
1. Search	Benefit: Potential access to more buyers. **No adaptation issues.**	Benefit: Efficient flower supply and auction database. **No adaptation issues.**	Benefit: Search costs are reduced. Potential access to more sellers. **Adaptation: provide different search options**
2. Valuation	Benefit: Higher prices due to more buyers and a transparent negotiating position. **No adaptation issues.**	Cost: Integrate traditional and electronic auction system. **Adaptation: Fine-tuning auction speed.**	Benefit: Less travel costs due to online bidding. **Adaptation: allow proxy-bidding.**
3. Logistics	Benefit: One logistical system for offline and online auction. **Adaptation: online system was restricted by not adapting this process.**	Benefit: No extra logistical system. Cost: Cannot satisfy logistical requirements. **Adaptation: Online system was restricted by not adapting this process.**	Cost: Greater logistical costs due non-coupling of online bidding with logistics. **Adaptation: manage logistical complexity.**
4. Payments and settlements	No change and adaptation issues.	No change and adaptation issues.	No change and adaptation issues.
5. Authentication	Cost: Online requires authentication process. **No adaptation issues.**	Cost: Online requires authentication process. **No adaptation issues.**	Cost: Online requires authentication process. **Adaptation: buyers implement adjusted authentication process.**
6. Product representation	Cost: Limited product quality representation. **Adaptation: Online system was adapted with respect to local process.**	Cost: Define and set up of online quality grading. **Adaptation: Online system was adapted with respect to local process.**	Cost: Less product quality information online *vs* offline. **Adaptation: Online system was adapted with respect to local process.**
7. Regulation	Cost: Align to online trading regulation. **No changes and adaptation issues.**	Cost: Align to online trading regulation. **No adaptation issues.**	Cost: Align to online trading regulation. **No adaptation issues.**
8. Risk management	Cost: Avoid online risks. **No adaptation issues.**	Cost: Avoid online risks. **No adaptation issues.**	Cost: Avoid online risks. **No adaptation issues.**
9. Influence	Benefit: Growers via auction cooperative influence online concept design. **Adaptation: Use of producers data to share responsibility and work with forecasts.**	Cost: Balance growers/buyers influence. **Adaptation: Stricter rules for sellers and provide forecast data.**	Benefit: Buyers could influence online system design. **Adaptation: incorporate design changes.**
10. Dispute resolution	No changes.	Cost: Incorporate online dispute resolution process. **Adaptation: adapt to online dispute resolution process.**	Cost: Incorporate online dispute resolution process. **Adaptation: adapt to online dispute resolution process.**
IT infrastructure	Cost: Implement Internet Protocol (IP)-based infrastructure. **Adaptation: Implement Internet Protocol (IP)-based infrastructure.**	Cost: Implement Internet Protocol (IP)-based infrastructure. **Adaptation: implement Internet Protocol (IP)-based infrastructure.**	Cost: Implement Internet Protocol (IP)-based infrastructure. **Adaptation: implement Internet Protocol (IP)-based infrastructure.**
Net benefit	*Positive: Wider customer base, less product quality information could result in lower prices.*	*Positive: Online system will increase customer base; unsatisfied logistical customer requirements*	*Positive: Online buying benefits, limited logistical and product quality functionality*

data to improve forecasts of future demand, and distributed forecast data to the flower growers. Third, local adaptations for buyers were made with regard to the authentication processes. Online buyers were required to authenticate themselves differently, using an online identification method. With regard to dispute resolution, online buyers had to design new inspection processes that could be carried out after the shipment and receipt of the flowers, as an alternative to direct on-site physical inspection of the flowers. However, as recalled by one Veiling Holambra manager, several buyers would make a bid by Internet to guarantee their price, but they also had to have a delegate physically present to arrange inspection and transportation. Fourth, the generic online auction concept was based on the open Internet Protocol (IP) architecture. Therefore, the local infrastructure of the flower growers, Veiling Holambra and the buyers had to be adapted. As a result, the IT infrastructure had to be made IP-based.

Adaptations in the generic auction system

Several adaptations were made in the generic auction concept. First, flower growers requested changes in the product representation process. Instead of three possible quality dimensions, there were two quality dimensions offered online to buyers, resembling the offline system. In the generic online auction system, three quality dimensions could be included – but these were not aligned with the local product quality dimensions, so flower growers and Veiling Holambra decided to exclude the third dimension. Second, Veiling Holambra decided not to offer the special logistical process to online bidders, for example, providing logistical and transportation services for online buyers who were no longer physically present in the Holambra complex. Therefore, online buyers had to organize and set up transportation and logistics for product bought online. Third, buyers requested the more advanced search functionalities and the proxy-bidding functionality in the generic online auction system. Proxy-bidding allows buyers to enter a bid before the auction process starts. The software bids for the buyer during the auction, freeing the buyer from having to continuously monitor the auction. Fourth, the flower growers and Veiling Holambra did *not* offer additional logistical services to online buyers. Therefore, buyers had to implement additional logistical processes in order to transport products to the buyers' locations.

Using historical narratives for understanding particular local adaptations

Analysis using a process/stakeholder framework suggests a balance between adaptations of Veiling Holambra's local business processes and rules, and adaptations of the generic online auction concept. It also suggests that both flower growers and flower buyers tried to influence the design of the generic online auction concept, helping identify the *extent of the local adaptations* carried out regarding the electronic marketplace model. However, the process/stakeholder framework does not say very much about *the nature of these local adaptations*: whether they were more influenced by Dutch know-how and, perhaps, mechanistically transferred; whether they were more influenced by the local knowledge of local people working on the implementation; or whether they were a result of mutual interactions. To answer these questions, we return to the historical narratives provided by our interviews, from which some important insights emerge.

> *"The implementation of the clock system was 100% carried out by a team of people from Veiling Holambra."*

As described previously, in order to implement the digital clock model, Veiling Holambra created a new department, which was given complete responsibility for its implementation. No external or foreign consultant worked on the project and all parameterization were carried out by the Holambra team. The fact that the Veiling Holambra project was implemented and managed entirely by local people was key to the adaptation–appropriation process. Having been given entire responsibility for the project, the local team was forced to acquire the knowledge (generic knowledge) necessary for implementing the IT solution. At the same time, they were very knowledgeable about the local context and, thus, able to implement accurate and often subtle, adaptations. This corroborates the significance of appropriation of technologies by local people in their local work situation (Avgerou and Walsham, 2000). Although external consultancy expertise may always help, it is important not to under-estimate local knowledge and capabilities.

> *"The clock technology and operation are 99% identical to the European model. There are no adaptations. Adjustments were made only in terms of content. For instance, in the Netherlands they exhibit three types of information about the quality of the product, whereas in Brazil we exhibit just two."*

This quote is somewhat surprising. One Veiling Holambra manager claimed that 'no adaptations were made' to the imported model. However, with further questioning, we started to discover 'small' changes. After additional questions, we could perceive not only a collection of small changes but some interesting innovations as well, as illustrated by the web-based application known as 'pre-offer' or 'proxy-bidding'. The fact that it is 'normal' in Brazilian culture to improvize and to change things 'a little bit' explains why local people do not easily acknowledge local adaptations.

This leads us to our third proposition: 'the nature of local adaptations can vary from one culture to another, and people engage in local adaptations in different ways. The success of generic application system projects is likely to increase if culturally dependent local adaptations take place. In the context of Brazilian culture, recurrent and subtle improvisations have positively influenced local adaptations'. Improvizing is so natural in Brazilian culture that people do not take it into account. However, its cumulative effect can provoke important changes in the long run. This is congruent with the assumption that organizational transformation is an ongoing improvization enacted by organizational actors trying to make sense of, and act coherently in, the world (Orlikowski, 1996). This

process of 'subtle' changes can be grasped using the notion of small and recurrent improvizations.

Each culture has its own way of engaging in local adaptations and, in the case of Brazil, people get involved via ongoing improvization without acknowledging that they are changing important processes in the long run. Perhaps, this is one of the reasons for the success of the Veiling Holambra. Since they believe that they have copied a successful model – and a Dutch model! – without changes, they feel confident about the entire process and its results. However, from an external perspective, we recognize that they have not *passively copied* a model but have *actively adapted* a model to their local conditions. Recognition of this particular cultural characteristic – '*jeitinho brasileiro*', the Brazilians' recurrent improvization – helps explain the nature of their local adaptations. In our view, the combination of the more rational culture of the Dutch immigrants (with specific emphasis on cost/benefits/speed/time) and the improvizational behavior of Brazilian people helped to produce the innovative usage of the generic application at Holambra. The amazing description of the first attempt at operating an auction model (with lamps mounted on and plugged into the wall) reveals a lot about Brazilians' 'way of doing' and their capacity to adapt to a lack of resources and unstable conditions. As was indicated by one of the interviewees:

> "*We hadn't enough money for implementing the required infrastructure. Unhappiness, I have not photos to show you but … you would not believe the way we started…*" (Veiling Holambra manager).

> "*We had almost nothing similar, nothing. So, we improvise …*" (Veiling Holambra manager).

Conclusions and implications

By answering the research question, 'How was the auction marketplace model transferred from Holland to Brazil', we have provided a rich description of how a particular organization – Veiling Holambra – imported a particular generic application system – a computerized auction market model – from Holland and adapted it to local conditions in such a manner that the implementation is perceived as successful by stakeholders, the community, and the media. We have adopted a historical approach, building a narrative of a Brazilian region where Dutch immigrants' involvement with the development of a community, and their progressive integration into a Brazilian culture help to explain the success of local adaptations. Although the historical approach reminds us of the 'richness of the human experience and of the broad degree of complexity, intricacy, and unpredictability that surround any real circumstance' (Mason *et al.*, 1997: 307), it also reduces our natural tendency to see everything as idiosyncratic, opening our mind to the experiences and learning processes of others, and to existing and new possibilities regarding problem-solving and organizational initiatives. The great case of Holambra offers several lessons about local adaptations that could be useful to other firms and regions.

In order to answer the second research question – 'What local adaptations of the generic application system were made and why?' – we have adopted two analytical approaches. First, we adopted the process/stakeholder framework as appropriate for identifying the *extent* of local adaptations of an electronic auction model. This reminds us that IT applications cannot be taken as black boxes, but should be considered in all their specificities. It also suggests that the successful implementation of a generic package, with fitting adaptations, is enhanced where all parts share values and see benefits on this process. Second, we complemented the first analysis with historically situated accounts that elucidate the *nature* of local adaptations. This leads us to the third research question: 'What factors could explain the success of these local adaptations?'

First, we suggest the small design-use gap as the first significant factor helping in explaining the success of Veiling Holambra – a factor that, if taken into account, is likely to contribute to other cross-cultural implementations. The case of Holambra invites us to rethink the recurrent conception that this gap refers mainly to different *degrees of development*. Although the degree of development does matter, we need to pay attention to the huge *cultural diversity* that exists even within a given country as well as to similarities that exist between different countries. The assumption that national cultures show strong homogeneity is problematic, and countries like India and Brazil are vivid examples of cultural heterogeneity (Walsham, 2002). Likewise, the assumption that developed and developing countries are intrinsically different is also simplistic. Rather than referring to developing and developed countries, we may speak of developing and developed regions because of within-country variations (Burn and Loch, 2001). Today, the region of Holambra has a level of development comparable to most European regions. In addition, reflecting intense migratory movement between countries, cultural similarities exist among dispersed regions. Brazilian regions like Holambra were so influenced by the immigration of bearers of a foreign (Dutch) culture that Holambra and Rotterdam display more similarities than do, for example, Holambra and Salvador (Brazilian city inhabited mainly by people of African descent). Thus, attention to cultural heterogeneity and similarities is extremely important in evaluating design-use gaps, directing attention to the significance of both contexts, that of the 'designer', and that of the 'user' – not only in terms of geographical distance or degree of development, but in terms of history, culture, social relations, economic conditions, and local competencies (Walsham, 2002).

Second, our study reinforces the value of a mutual-influences approach. In contrast to aspiring to an ideal of universal and standardized modernization that often presupposes a passive and mechanistic adoption of foreign IT 'solutions', and to radically neglecting any 'generic' application, which often means neglecting relevant knowledge and experiences people have accumulated worldwide, the taking of a mutual-influences perspective is considered beneficial for implementations across locations. Our investigation of Holambra outlines the importance of having local people managing the implementation. Local people are able to appropriate the accumulated knowledge

and improved business processes supposedly embedded in generic solutions while addressing local specificities and contingencies. Likewise, 'generic designers' may gain access to innovations and incorporate them into the generic model. The 'pre-offer' or 'proxy-bidding' tool is an example of a web-based innovation provided by Veiling Holambra that has received international recognition.

Finally, local adaptations can vary from one culture to another and we need to pay attention to particular ways in which people engage in local adaptations to better understand the entire process. Often, improvizations are presumed to occur as a reaction to a crisis, emergency situation, or unexpected event. The concept of improvization as a *recurrent element* is absent from the literature of organizational change. In our case, we recognized a national characteristic that is well known to sociologists who have investigated Brazilian culture. The 'Brazilian way', the '*jeitinho brasileiro*', is a recognized national institution that helps explain how Brazilian people change things without necessarily being aware of the scope of their changes. The organizational improvizations carried out by Brazilian people, by the Veiling Holambra team in our study, may have often been subtle, but they were *recurrent*. In the long run, these ongoing improvizations eventually catalyzed important changes to the original model. Brazilian cultural openness to local improvization helps to explain, although not exhaustively, the success of the Holambra project. In cultures where improvization is not a regular part of people's daily practices, there exists the danger of completely rejecting or accepting a generic IT. Rejecting it will deprive them of potential benefits. Accepting it will force them to adjust local business processes (including rules and norms) to the generic standard, leading to a loss of local diversity and richness.

The three propositions formulated in this study are applicable to other firms intending to adopt generic IT 'solutions'. They can guide IT practitioners and managers in their decision-making process concerning the adoption of a new IT, encouraging firms across locations to use generic IT but to locally adapt it. Appropriation and local adaptations vary in degree. Subtle adaptations are sometimes enough to ensure the success of an IT adoption. Although several researchers have pointed out the importance of local aspects in IT implementation, few have suggested what those aspects of adaptation are. This paper fills the gap, providing a concrete illustration and opening new avenues for future research.

We suggest at least three avenues for future research. The first deals with the design-use gap. More research is needed for a better understanding of how companies might be able to manage and influence the design-use gap. To what extent can a firm cope with a wider gap and still implement a generic application bringing benefits? Different design-use gap situations could be analyzed. The second deals with the mutual-influence perspective and should analyze what specific generic and local features of application systems can be adjusted, and what impact these adjustments will have on the overall usability and success of the systems. Strategies of co-evolution and reciprocal influences should also be analyzed (see also Mitleton-Kelly, 2003) and applicable rules for practitioners should be identified. The third avenue deals with the role of improvization. Future research could test the proposition that it seems more difficult to achieve successful implementations of generic applications in situations of work practices with a long and stable history. The more firmly embedded the work practices have become, the more difficult it becomes to adapt and improvize. Improvizations may emerge by design and be embedded in formal systems that are authorized by management, or they may be informally adopted by the work force without the authorization, or even awareness, of top management (see, for instance, Land, 1992). Future research should address the relationship between formal and informal aspects of improvization and how these evolve over time in different cultural settings.

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Notes

1 'Veiling' is the Dutch word for 'auction'. The word 'veiling' is now also used in the Portuguese/Brazilian language.
2 The interview protocols are available upon request.
3 We consider the 'Dutch' online auction model as a generic application system for two main reasons: (1) it was primarily developed by a consortium of software and hardware suppliers and flower auctions in Belgium, Germany, and the Netherlands; and (2) it has been exported, implemented and tested worldwide (e.g., Africa, Australia, Asia).

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About the authors

Marlei Pozzebon is Assistant Professor at the HEC Montréal as of June 2002. Her research interests are the political and socio-cultural aspects of information technology implementation, the use of structuration theory, and critical discourse analysis in the information systems field, business intelligence, and the role of information technology in local development and corporate social responsibility. Before joining HEC, Marlei worked at three Brazilian universities. Marlei also works as IT consultant from 1995. Previously, for at least 10 years, she worked as systems analyst. She has published in the *Journal of Management Studies*, *Organization Studies*, and *Journal of Strategic Information Systems*.

Eric van Heck holds the Chair of Information Management and Markets at RSM Erasmus University, where he is conducting research and is teaching on the strategic and operational use of information technologies for companies and markets. He has co-authored or co-edited 12 books, such as Making Markets and Smart Business Networks. His articles were published in *California Management Review*, *Communications of the ACM*, *Decision Support Systems*, *Electronic Markets*, *European Management Journal*, *Harvard Business Review*, *International Journal of Electronic Commerce*, *Journal of Information Technology*, *and Information Systems Research*.