

## Research Article

# From Public Loudspeakers to the Internet: The Adoption of Information and Communication Technologies (ICTs) by Small-Enterprise Clusters in Vietnam<sup>1</sup>

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### **Abstract**

*This paper discusses the impact of information and communication technologies (ICTs) on the development of clusters of small export-orientated enterprises in the Red River Delta region of northern Vietnam. Using the cluster concept, it argues that the many dormant small-scale industry clusters found in developing countries could be transformed into more vibrant entities through the adoption of ICTs. The penetration of these technologies in the export-oriented and private-enterprise sector in the Delta was found to be quite significant. The paper discusses the implications of the empirical findings and suggests a reconsideration of policy issues concerning the adoption of ICTs to foster Vietnam's economic development.*

### **Introduction**

Groups of small-scale enterprises concentrated in a geographical area are commonly encountered in developing countries. In rural areas of South-east Asia there are many examples of such clusters, specializing in low-tech production of handicrafts such as ceramic products, woodcarving, furniture making, silk production, embroidery, weaving, bronze casting, silver jewellery, basket making, etc. The traditional view has been that these rural and highly heterogeneous non-farming activities constitute a low-productivity sector producing mostly low-quality goods, which will gradually cease to exist as the country develops. Policymakers and planners have thus been paying scant attention to the contribution of the non-farming sector in the broader development process. But recent evidence suggests that in many developing countries the sector is not declining, as predicted, but instead is expanding (Lanjouw and Lanjouw 2001:1). As a consequence, policymakers are now showing increasing interest in small-scale, rural non-farming enterprises, which generate considerable employment by means of low initial investment and low working capital (Yusuf 2003:232–3).

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A growing literature, backed in recent years by empirical research, has contributed to our understanding of the dynamics and complexities of relationships among the different actors in small-scale enterprise clusters<sup>2</sup> in Southeast Asia (see, for instance, Scott 1994; Cole 1998; Konstadakopulos 2000; Sandee and Rietveld 2001; Wheatley 2001). It is well established that the geographic agglomeration of economic activities is conducive to the creation of so-called localized economies (i.e., efficiency derived from the clustering of enterprises belonging to the same sector) (Scott 2002:4). Geographical proximity brings various benefits to small-scale producers as it can create an associative order among enterprises through the exchange of knowledge, information, and skilled employees.<sup>3</sup> Being in a cluster facilitates the attainment of common goals, such as securing new markets. Moreover, it makes it easier for policymakers to bring about changes more effectively (Wheatley 2001).

However, Sandee and Rietveld, drawing from their empirical work in Indonesia, describe the majority of small-enterprise clusters in developing countries as dormant, since the constituent firms operate independently from each other (2001:152). The presence of the clusters is due to the exploitation of existing skills and use of local, and mostly bulky, materials such as clay, bamboo, seagrass, timber, silver, copper, etc. Skills are normally passed from one generation to the next, and it is not unusual to conceal production know-how from outsiders. The development of cooperation between enterprises could bring some common benefits, such as overcoming scale disadvantage by jointly undertaking the sourcing of raw material or creating a shared pool of skilled labor (Wheatley 2001). However, such forms of collaboration are insufficient to develop the cluster further, so it remains static over time. Technological change—as well as more explicit forms of collaboration among small producers working together toward a common goal—is necessary to make the cluster a dynamic one, with a high prob-

ability of becoming innovative. Collaboration is based on trust and reciprocity, rather than extended family networks, and the costs of purchasing expensive and technologically-advanced equipment and machinery is shared among small producers (Sandee and Rietveld 2001:152). Nevertheless, some external factors could encourage dormant or static small-scale clusters to become dynamic—such as, strong competition from new and/or large urban-based producers; a national market that is expanding due to high population growth; and increasing disposable income presenting greater business opportunities. Even more importantly, the growth of the cluster could be facilitated by the adoption of ICTs and e-commerce providing enterprises with the opportunity to find new markets.

In the next section, we highlight some of the debates that focus on the spatial impact of ICTs, discuss the development of handicraft clusters in the Red River Delta of northern Vietnam, and then present our empirical findings on the adoption of ICTs by clustered handicraft enterprises in the Delta, including the constraints encountered. In the final section, we discuss the implications of our findings and suggest a reconsideration of the policy issues concerning the adoption of ICTs for the economic development of Vietnam.

### The Impact of ICTs at the Spatial Level

So how will the introduction of new ICTs affect the social and economic dimension of small-scale enterprise clusters in developing countries? The implications of adopting ICTs are multifaceted, complex, and frequently contradictory.<sup>4</sup> ICTs could completely revolutionize the process of information exchange within the cluster and with other clusters. However, ICTs also generally tend to reduce staffing levels, since they increase productivity, which could be a challenge to developing countries as the trend for surplus agricultural workers to move to urban areas

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2. Clusters have been a popular, albeit chaotic, topic for discussion over the last few years. See Steiner (1998) and Yusuf and Evenett (2002) for an extensive review and critique.

3. See Scott (2002) for a comprehensive discussion of the positive externalities and increasing returns that arise from geographical agglomerations.

4. The literature of ICTs and development contains a certain amount of hyperbole, and a profusion of disparate views and opinions, regarding the exact role played by ICTs in national development. Furthermore, the somewhat limited empirical findings have so far been inconclusive (Avgerou 1998; Yusuf and Evenett 2002; UNCTAD 2003:xix; Sein and Harindranath 2004). Yet, despite these reservations, there is growing evidence that ICTs have the potential to bring about a wide range of benefits to the economies and societies of all countries.

is creating an urgent need for more jobs. (Countering this, though, is the fact that ICTs do also create employment in high-skilled, knowledge-intensive sectors and in new industries, such as computer hardware and software production.) Another point in favor of the adoption of ICTs is that they can improve the efficiency of information exchange within a cluster, minimize transaction costs, and influence the organizational development of the enterprises, which might accordingly embrace changes to their production and marketing processes and become more competitive. Thus an intensive inter-firm collaboration develops, and the cluster becomes dynamic.

The adoption of ICTs to revitalize dormant or static traditional clusters is attracting the attention of policymakers and foreign aid agencies in South-east Asia in general, and Vietnam in particular,<sup>5</sup> because it has the potential to:

- reduce the isolation of rural clusters through electronic connections to information about markets, product design, new technologies, etc.;
- enable all small-scale enterprises to gain access to distant markets;
- share infrastructure resources; and
- promote long-term rural development.

At present, most policymakers in Vietnam (and other developing countries) focus too intently on the supply side of ICTs, believing that the constraints on remote rural enterprises expanding to new markets could be overcome solely through the introduction of these new technologies (Doanh 2002:252–253; UNESCAR 2003). However, certain factors can hamper their effective use once they are in place. One of the most pervasive, and therefore “perhaps the most resistant to change,” is the technology-averse

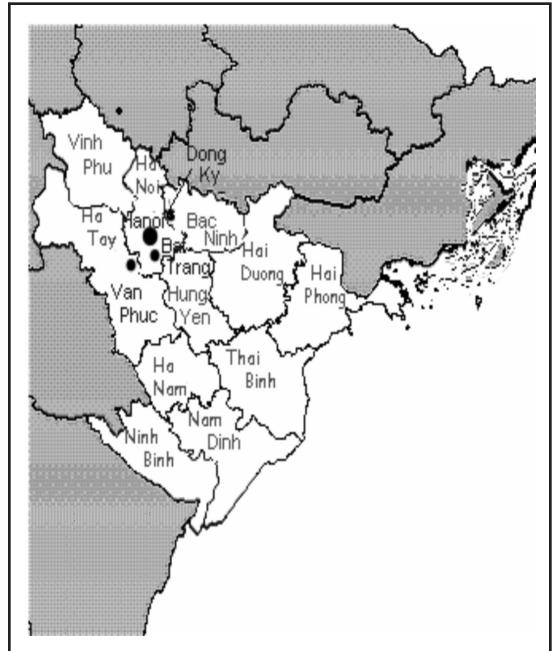


Figure 1. The Red River Delta

culture of many traditional societies (Tiene 2002:215). Sein and Harindranath (2004) emphasize that ICTs will not foster economic progress in developing countries unless they are suited to the socio-economic and cultural environment. The adoption of ICTs depends, therefore, on changes being made at the cultural, institutional, managerial, and organizational levels, and on the inter-relationships between these levels (Gibbs 2001:74).

### The Red River Delta<sup>6</sup> Handicraft Clusters

The Red River Delta covers 11 provinces (Figure 1) with 17.2 million inhabitants (2001)—79% of whom live in rural areas. The Delta's population is

5. USAID Vietnam undertook a project entitled “Vietnam Competitiveness Initiative (VNCI)” (2000–2002), focusing on the development of clusters. One of the project's case studies concentrated on the ceramic agglomerations found in the village of Bat Trang near Hanoi (see also the report “Bat Trang Ceramics Competitiveness Strategy” [May 2003]). A project entitled “A Study of Artisan Development for Rural Industrialisation in Vietnam”—undertaken by the Ministry of Agriculture and Rural Development of Vietnam (MARD), with the assistance of the Japan International Cooperation Agency (JICA) (2002–2004)—investigated the development of handicraft clusters by conducting a number of pilot studies in selected provinces in Vietnam. The eLangViet project developed by the UNCTAD-UNDP Global Programme on Globalisation, Liberalisation and Sustainable Human Development (2004–2006) aims at promoting the adoption of ICTs in order to develop the social and economic well-being of the people of Vietnam, initially in just eight villages spread over six provinces. The project is examining inter alia, the garment manufacturing village of La Phu (Ha Tay province) and the embroidery handicraft village of Minh Lang (Thai Binh province) (Feasibility Study, December 2004, [www.elangviet.com](http://www.elangviet.com)).

6. Using the nomenclature adopted by National Statistics of Vietnam, the Red River Delta is now defined as being the

## ADOPTION OF ICTs BY SMALL-ENTERPRISE CLUSTERS

dense, and two of the country's major cities—Hanoi, the capital, and Haiphong (a major port)—are found within its boundaries. The relatively-high population density and the large proportion of people engaged in agriculture could become sources of social unrest if the gap between urban and rural areas widens.<sup>7</sup> Given the fact that benefits of land redistribution in rural areas have now been realized (production has peaked, with little potential for future growth),<sup>8</sup> the country's non-agricultural sector will need to expand in order to provide employment to migrants in the large urban centers of the Delta.<sup>9</sup>

Although the state-owned enterprise sector is still important in Vietnam, the foreign-owned sector and the private domestic sector<sup>10</sup> (mostly household businesses and small- and medium-sized enterprises [SMEs]) lead the country's economic growth and provide employment to an increasing number of rural migrant workers in the Delta's major cities. These sectors also produce the majority of Vietnam's industrial output.<sup>11</sup> In 2002, in the province of Ha Noi alone, the private sector (consisting of 17,660 enterprises) produced an output of 2.6 billion dong and employed over 80,000 people.<sup>12</sup> Furthermore, most of this contribution to the economy is made by household businesses. According to Report 26 of the Red River Delta Master Plan (1994b), handicrafts accounted for 30% to 75% of all non-state manufacturing employment (the lower figure being for

the province of Ha Noi and the higher for the province of Ha Nam). In the early 1990s, roughly 60,000 households in the Delta were involved full-time in handicraft production, employing around 300,000 people. The report also estimated that 50% of the Delta's households primarily engaged in farming (over a million) also devoted a portion of their time to producing handicrafts.

The contribution made by small handicraft clusters to the economy of Vietnam as a whole, and the Red River Delta in particular, has been remarkable. A number of towns and villages specialize in the production of artifacts, such as, porcelain, silk textiles, embroidery, and carved wooden objects. Their existence is a consequence of certain historical factors: the accumulation of skills over decades, if not centuries; the proximity to vital natural resources; the presence of agglomeration economies; and the deliberate wartime policy of dispersing the country's industry (EIU 2002:31). There are now approximately 1,500 handicraft villages in Vietnam, the majority (70%) concentrated in the Red River Delta area (Duc 2000:24). A recent craft-mapping survey by the MARD-JICA study (2003) reveals that many are located in the provinces surrounding the Delta's major urban areas. Crafts are also practiced in the cities, particularly in Hanoi and its semi-rural hinterland.

The development of such indigenous pre- or proto-capitalist handicraft clusters in the Delta, and

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11 provinces of Ha Noi, Hai Phong, Vinh Phu, Ha Tay, Bac Ninh, Hai Duong, Hung Yen, Ha Nam, Nam Dinh, Thai Binh and Ninh Binh. "Hanoi" refers to the city, and "Ha Noi" to its province.

7. According to the Vietnamese Government household survey data, quoted by Mekong Economics, in 1996 the richest 10% of households had an income 10.6 times that of the poorest 10%. This figure has lately risen to 12.5. The most significant gap is that between the urban and rural areas of Vietnam (Mekong Economics Ltd. 2003). However, this is mitigated by the equalizing effect of the national budget, which distributes more revenues to the poorer areas (EIU 2003:31).

8. World Bank, Report No. 25050-VN, 'Vietnam Delivering on its Promise', Development Report 2003, November 21, 2002. See also Thoburn (2004).

9. Since the early 1990s the Red River Delta, along with the Mekong Delta, has been central to the government's plans for the production of staple foods and the development of rural industries. The government strategy for urban development has leaned toward medium and small centers, rather than large urban ones. Key industrial areas, such as the northern part of the Delta—including Hanoi, Haiphong and Quang Ninh—were designated as growth areas intended to attract domestic and foreign investments (Red River Delta Master Plan 1994a).

10. There are four types of companies in Vietnam: central-state, local-state, non-state and foreign. The term "non-state sector" includes cooperative firms (tap the), mixed or joint stock (hon top), limited liability (trach nhiem huu han), private or individual business (tu nhan), and family business (ca the). Most non-state sector firms are family-owned. Confusingly, private firms are often owned by the state in the form of shareholding, while some state firms can be found to "operate privately" (Gainsborough 2003:16–17).

11. In 2002, non-state activity continued to achieve the greatest industrial growth at 19.2% compared to 11.9% for the state sector. If these growth rates continue, it is expected that the non-state sector will exceed the state sector's industrial output by 2010 (Mekong Economics Ltd. 2003).

12. Provincial Statistics, Ha Noi, 2003.

their historical evolution, is becoming a popular subject for research (Ca, 2003) and a target for assistance from Vietnam's foreign aid agencies. Their growth has frequently been both spontaneous and fortuitous. For instance, the village of Dong Ky, and others around it in Bac Ninh province, produces carved wooden furniture. Dong Ky was known as the firecracker village until 1995, when their use was banned by the government. Although wood-carving was already practiced at the time, this ban forced the village to concentrate exclusively on furniture making, which has now become a flourishing sector.

The Bat Trang ceramic village in Ha Noi province is one of the most important ceramic centers in Vietnam, with a pottery tradition going back at least 1,000 years. The village is located 10 kms southeast of Hanoi. A total of 1,172 families, with over 800 kilns at their disposal, are producing 50 million assorted ceramics annually and providing additional employment to somewhere between 1,500 and 2,000 workers from surrounding villages (Duc 2000:24). It is estimated that 83% of families living in Bat Trang are involved in the ceramic trade, which in 2002 generated US\$40 million in exports (VNCI, 2003).

Van Phuc, known as the silk village, is situated in Ha Tay province, eight kms southwest of Hanoi. The village has approximately 800 households involved in textile making and dyeing. There are more than 1,000 textile machines, with a total capacity of 2.4–2.5 million meters of silk. Many of the textiles produced in the village are further processed into ready-made garments and accessories. A high proportion of the fine silk accessories sold in the tourist shops of Hanoi are made and tailored in the village.

Surprisingly, it is only since the late 1990s that the Vietnamese government has begun to develop concrete policies and plans for the modernization of agriculture and the promotion of handicraft and other valued-added rural activities (Bezanson et al. 1999; Duc 2000:27). Generally speaking, policies on the development of the handicraft sector at the provincial and local levels are unclear. In its progress report, the MARD-JICA study states that, although policies do sometimes exist at the provincial level, "their effect on the communes and the villages is

quite limited" (2003:2–4). It is important to note here that Vietnam has a long history of regionalism, partly because of geographical reasons (it being a long, narrow country). Subnational levels of government (e.g., the provincial and local levels) have considerable economic powers and resources. These powers have increased with the trend toward decentralization that has resulted from economic reforms. There is, however, a lack of policy coordination between the different levels of government, possibly a consequence of the perceived "tug of war between centre and periphery" that is taking place in Vietnam (Gainsborough 2003:3). Several studies indicate that the country's planning and administrative capacity at the subnational levels also needs to be strengthened and made more transparent,<sup>13</sup> because these levels of government not only influence access to key factors of production, such as land and capital, but also grant business licenses, approve investments, register businesses, and make on-site inspections (Chand, Runcan, and Quang 2001; World Bank 2002; Dinh 2003; Gainsborough 2004:267).

However, the discretionary powers of administrators at all levels in Vietnam are still high. This leads to uncertainty and incurs transaction costs that reduce incentives to invest. Vietnam's regulatory environment not only lacks transparency but also has the irrefutable reputation of being one of the most corrupt in Southeast Asia (Chand et al. 2001:284–285; Dinh 2003:245) despite attempts by the ruling Communist Party to punish corrupt officials (EIU 2003:7). These failings not only impede business transactions and raise uncertainties about future economic returns, but also substantially lower the levels of economic activity in Vietnam.

### **Organization and Finance**

As mentioned, most of the handicraft industry units found in the Delta's clusters are household enterprises. Until fairly recently they were organized into cooperatives subsidized by the government and helped by state export houses. Even though handicraft producers earned the right in 1978 to work independently, many chose to remain in cooperative groups comprised of several families. However, the changes in Eastern Europe in 1989 resulted in the sudden loss of their main market, and membership

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13. For an overview of local government in contemporary Vietnam, see Kerkvliet and Marr 2004.

## ADOPTION OF ICTs BY SMALL-ENTERPRISE CLUSTERS

declined dramatically. As a consequence, cooperatives were replaced in the 1990s by household manufacturing units.

These units typically employ around 4–6 members of the same family (full- or part-time), hiring additional labor on a daily or piecemeal rate. The owners of such household enterprises are obliged merely to obtain a business license from local government, and are subject to neither the newly enacted Law on Private Enterprises nor to Company Law. A major advantage is that their tax burden is lower than for private enterprises. However, their rights are limited as they are not allowed to enter into legally-binding business contracts (Kokko 2000:13). They have been very successful despite this, growing in size, capital intensity, and labor productivity. As they expand, they have the option either to remain a household enterprise and forfeit any growth opportunities, or to register as a private business and fall under the jurisdiction of both the Private Enterprises Law and Company Law (Kokko 2000:14–15). Statistical data—and evidence from our own survey—reveals that many of them choose the second option.

The comprehensive pro-market reforms have also brought significant changes in land ownership and individual property rights.<sup>14</sup> However, the property market has been slow to develop, and there is growing evidence that uncertainty in land deals and prices<sup>15</sup> has led to inefficient use of this scarce resource. A major handicap for the growth of family household units has been the extreme shortage of external finance for start-ups and expansion. Their small size and lowly status make it impossible to obtain from state-owned and joint-stock commercial

banks the credit necessary for improving their technology and expanding their production. As a consequence they make use of low technology and produce low-quality products. Moreover, they cannot afford to open their own outlets to sell directly to their customers (Duc 2000:26).

It is well documented that the vast majority of such enterprises rely for capital investment on their own resources (savings and the firm's internally-generated revenue) or on informal credit sources (loans from family and friends). Borrowing from banks and other sources has been negligible (Ramamurthy 2000:259–260). Even if such credit is available, interest rates are high and only short-term loans are available. However, insecure property rights have primarily impeded commercial transactions and reduced levels of economic activity in Vietnam (Chand, Runcan, and Quang 2001:283). Commercial banks, for instance, have been reluctant to offer credit to agricultural households. Incremental reforms are taking place, and improvements being made to property and contractual rights.<sup>16</sup> However, reform of the banking sector has been slow,<sup>17</sup> which could hinder the optimal allocation of Vietnam's insufficient financial resources.

The lack of easily available finance precludes the construction of new premises and workshops, as well as the acquisition of new technologies. It also perpetuates cramped working conditions and the environmental degradation found in many handicraft clusters. Old technologies are highly polluting, and many of the input source materials are becoming exhausted. Some important resources—especially timber, pig iron, and copper<sup>18</sup>—can no longer be found locally, and many handicraft pro-

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14. *Although, legally speaking, there is no private land ownership in Vietnam, in practice land is sold and purchased freely.*

15. *Prices set by the state and those of the actual market can differ by up to 400%. A draft of the revised Land Law, put before the National Assembly, will abolish the practice of the state providing free land to state officials, and will clarify the auctioning of land-use rights for purposes of non-agricultural production, trading, and housing (Viet Nam News, September 4, 2003).*

16. *In 2002, ownership of certificates granting land-use rights was expanded, and registries for recording collateral loans were established in the country's three major cities (Hanoi, Danang, and Ho Chi Minh City) (Mekong Economics Ltd. 2003).*

17. *The government has wavered over reforms of its five state-owned commercial banks, and will wait until 2005 before proceeding with their privatization (EIU 2003:17). Nevertheless, the State Bank of Vietnam is relaxing the strings attached to foreign banks in providing loans in Vietnamese dong for SMEs (Viet Nam News, September 4, 2003).*

18. *On a positive note, recycling of heavy metals, particularly copper, is practiced in many small villages around Hanoi. Copper recycling on a large scale has been operational in Dai Dong village (in the former Hai Hung province, now Hai Duong) for the last 60 years, although such activity causes extensive pollution (Duc, Minh, and Vinh 2003).*

Table 1. Vietnam's Handicraft Exports (Millions US\$)

	1999	2000	2001
Rattan, Bamboo, and Sedge-Based Products	62.2	78.6	
Fine-art Products	25.5	36.2	} 235.2
Embroideries	32.6	50.5	
Pottery and Glassware	83.1	108.4	
Total Export Turnover	11,541.1	14,482.7	15,027.0
Ratio of Handicraft Export to Total Exports (%)	1.76	1.89	1.57

Source: National Statistical Yearbook, 2002

ducers reportedly depend on illicit or smuggled materials (Duc 2000:26). In addition, the numerous handicraft villages in Hanoi's suburbs still use significant amounts of highly-polluting coal and firewood for energy. However, a considerable number of fast-growing enterprises are shifting to higher technology machinery. In Bat Trang, for instance, coal-fired kilns are gradually giving way to the more economical and energy-efficient LPG kilns,<sup>19</sup> while in Van Phuc all looms are now electrically powered.

### Markets

The largest market for the Delta's handicraft sector is considered to be its local consumers. However, it is shrinking due to the fact that Vietnam's emerging market economy is leading to changes in consumer taste—away from handicrafts towards introducing modern materials (for example, plastic replacing ceramics).<sup>20</sup> This decline in the local market, along with a general lack of marketing knowledge among Vietnamese entrepreneurs (Kokko and Sjöholm 2004:32), has been restricting the development of some village handicraft industries.

The numerous shops in Hanoi that cater to tourists constitute another lucrative market, especially for lacquerware, embroidery, and woodcarving. A third important source of revenue for handicraft producers in Vietnam, and the Red River Delta in particular, is the export market (Table 1).<sup>21</sup> Porcelain,

lacquerware, and traditional Vietnamese- and Chinese-style furniture have been successfully exported to Taiwan, China, and Japan for some time now and, more recently, wooden artifacts and ceramics have become popular with Vietnamese expatriates in the United States (Vang 2003:26–30). However, overseas demand for traditional Vietnamese handicraft is generally rather limited, and handicrafts account for less than 2% of all exports. The blame lies partly with the country's cumbersome exporting procedures, which affect small enterprises more than larger, more sophisticated businesses.

The most promising sectors in the Delta's handicraft industry, in terms of export markets, are considered to be home furnishing and fashion accessories, in which Vietnam has a comparative advantage. However, as identified by our field research, a number of constraints impede the competitiveness of Vietnam's export-oriented enterprises.

## Empirical Work: The Red River Delta and the Case for Adopting ICTs

### Methodology

#### Questionnaire development

The questionnaire was first developed in English, drawing on the author's experience in conducting a similar survey on technological adaptation in South-

19. It is estimated that, of the 800 coal-fired kilns operating in Bat Trang village 10 years ago, 180 had been converted by 2003 to LPG kilns (USAID 2003).

20. See, for instance, the report on the competitiveness of the ceramic cluster in the village of Bat Trang, produced by the Vietnam Southeast Asia Competitiveness Initiative, and funded by the US Agency for International Development (USAID 2003).

21. However, detailed statistical data on handicraft industries at the provincial or district level are lacking. Estimated statistics can be derived for rural areas from the number of non-state manufacturing enterprises (or small industries), which are mainly in the handicraft sector.

## ADOPTION OF ICTs BY SMALL-ENTERPRISE CLUSTERS

east Asia. In order for it to apply specifically to the Vietnamese business environment and culture, it was then slightly modified by a senior Vietnamese official from the National Institute for Science and Technology Policy and Strategy Studies (NISTPASS) in Hanoi, who has considerable expertise in the field of ICT adoption by the traditional handicraft industry. The questionnaire was subsequently translated into Vietnamese by a bilingual local researcher who acted as an interpreter during most of the survey. To verify the accuracy and quality of the adaptation and translations, pre-tests were carried out using a small number of firms. This helped to identify one particular problem. The question about their annual turnover in 2002–2003 was clearly a sensitive issue, since few of them were willing to disclose this information. As a consequence, it was dropped from the questionnaire.

### Sample and data collection

As acknowledged by a number of researchers (see, for instance, Swierczek and Ha 2003:48), it is difficult to develop adequate sampling methods in Vietnam, and the databases of small enterprises are either inadequate or unavailable. The starting point for the survey was a limited database of handicraft firms in the Delta provided by NISTPASS. This was later supplemented by a list of those involved in exporting, which was made available by the European Chamber of Commerce in Vietnam. The Vietnamese research assistant contacted the firms identified through these two sources and arrangements were made to interview the owner or senior manager (who is widely seen as the only appropriate source of information to foreigners). Not every enterprise was willing to participate, so others were sought by random selection (e.g., cold calling to every fifth establishment in the high street of a handicraft village).

Collection of data was also problematic. The research team (i.e., the author of this paper and his assistant/interpreter) faced a number of obstacles, including the onerous task of locating firms in the chaotic maze of Hanoi's back streets, the inaccessibility of enterprises in the remoter parts of the Delta, and the problem of communicating with en-

trepreneurs, as very few of them were able to communicate effectively in English. Nevertheless, it was felt that the best way to conduct the survey was to carry out face-to-face interviews in Vietnamese, using an interpreter, with the team collecting data using the prepared questionnaire. This approach was, as it turned out, extremely advantageous, as the author was able to obtain a first-hand picture of the handicraft firms, their production techniques, type of workforce, and the kind of ICTs employed. Data was obtained in this way from approximately three-quarters of the enterprises surveyed; for the remainder, the questionnaire was left with the owner/manager and collected at a later date by the Vietnamese assistant. This resulted in the completion of 56 valid questionnaires, which form the basis of the analysis that follows.

The sample consists of firms located in Hanoi,<sup>22</sup> the well-known handicraft villages of Bat Trang (ceramics), Van Phuc (silk), Dong Ky (wood carving), and some smaller and less renowned villages in Ha Tay province. The majority of the enterprises were small or medium sized employing on average 125 employees (Table 2). However, a few large concerns were included: producers of ceramics and furniture mainly for the overseas market and employing a considerable number of permanent and part-time workers. Although the sample size is relatively small and the businesses reflect a somewhat diverse handicraft sector, the degree of detail obtained from the survey, and the nature of the results, enable some important conclusions to be drawn regarding the adoption of ICTs by small enterprises in the Delta.

The interviews took place during the months of August and September 2003. Information was obtained from the enterprises regarding their owners and/or managers; their most important markets; the use of ICTs and constraints on their adoption (see Appendix 1); firm collaboration and linkages (see Appendix 2); and the type and nature of business support that has been sought from local government (see Appendix 3). Finally, their expansion plans for the next three years were solicited, along with their intentions to embrace ICTs or improve existing ones.

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22. Some of the enterprises based in Hanoi reported that their main workshops or factories were located in the city's suburbs, or in villages scattered throughout the Delta (e.g., Ha Dong, Dai Mo, Tay Mo, Cau Dien, Mai Dich, and Kim Giang).

Table 2. Comparison of Handicraft Enterprises and Marketing Chains in the Red River Delta, 2003

	Households (n=11)	Private (n=42)	Other (n=3)	Total (n=56)
<b>Enterprise Characteristics</b>				
Average number of years in operation	7.4	6.8	18	7.8
Average number of full-time employees	60	137	187	125
Average age of owner	37	39	45	39
Average number of years in owner's education	12	14.4	14.3	13.9
Sex ratio of owners (male/female)	6/5	32/10	3/0	41/15
Average amount of land access in m <sup>2</sup> (no. of enterprises responding)	338 (9)	2,623 (34)	300(2)	2,063 (45)
<b>Enterprise's Main Final Market (Number of Times Mentioned)*</b>				
(a) Low-income rural consumer	1			1
(b) Low-income rural and urban consumer	1			1
(c) Middle-income urban consumer	1	8		9
(d) High-income urban consumer	6	25	1	32
(e) Tourist or export market	5	40	2	47
<b>Enterprise's Marketing and Selling of Their Products (Number of Times Mentioned)*</b>				
(a) Direct sales to customers	9	34	3	46
(b) Sales through intermediaries	5	15	2	22
(c) Sales through wholesalers	6	21		27
(d) Own export department	2	3	1	6

\*Multiple answers allowed

### Analysis and Results

The main aim of the study was to shed light on how the adoption of ICTs leads to changes in cluster behavior. It was important, therefore, to begin by identifying which ICTs (from fixed or mobile telephony, the Internet, and dedicated Web sites)<sup>23</sup> are currently being used by the Delta's handicraft enterprises. Somewhat surprisingly, all of those surveyed (even the smallest rural households) reported having their own fixed and/or mobile telephone (Table 3). Moreover, 75% owned a personal computer and had dedicated Internet access for communicating by e-mail. Six household enterprises (11%) could access e-mail through an Internet café or by sharing equipment owned by other enterprises. As expected, the use of e-mail was much more commonly

practiced by the larger private concerns than by the smaller households.

Fourteen (25%) of the sampled enterprises had created their own dedicated Web site<sup>24</sup> (although no one uses it yet for e-commerce). However, a search of some of these Web sites revealed that many were not accessible for technical or other reasons; of those that were, most were of basic design and poor content, often being simply an extension of the firm's sales catalog. On a more positive note, a small number of Web sites produced by leading export enterprises have been professionally designed and are interactive, interesting, and informative. This is an impressive development, given that most information in Vietnam is conveyed in the old-style Communist fashion, via public loudspeakers and mass meetings. One of these Web sites, indeed, is so styl-

23. The definition of ICTs normally also includes fax, satellite, and videotext, but practical constraints precluded their consideration.

24. This is well above the 2% mentioned by Dapice (2003:22).

**ADOPTION OF ICTs BY SMALL-ENTERPRISE CLUSTERS**

*Table 3. Adoption of ICTs by Handicraft Enterprises in the Red River Delta (2003)*

<b>Enterprises Having:</b>	<b>Percentage of Enterprises*</b>
Fixed and/or Mobile Telephone	100
Personal Computer and Dedicated Internet Access (e-mail)	75
Access to e-mail through an Internet café or by Sharing with other Enterprises	11
Dedicated Web site	25
Facilities for e-commerce	0

\*N=56

ish that it received the *Arch of Europe* award for quality and technology in 2002.<sup>25</sup>

The survey provided further insight with regard to inter-firm linkages, networks, and forms of collaboration within the handicraft clusters. In the theoretical concept of clusters, such interaction is one of the most important factors in facilitating learning and the acquisition of knowledge (Konstadakopoulos 2004:78–79). When our entrepreneurs were asked to disclose whether they had cooperated with another local enterprise in the cluster within the past year, a slim majority (59%) reported having done so. Moreover, when asked how often the enterprise exchanged ideas with their most important customers, wholesalers, and intermediaries, the vast majority (79%) answered *frequently* compared with 19% for *occasionally*. Just one firm reported never having exchanged ideas. In the clusters studied, ideas are exchanged between enterprises, and between entrepreneurs and intermediaries, mainly through face-to-face contact, landline phones, or mobiles, rather than via the Internet. It was observed that in some of the smaller firms kept their PCs turned off and only occasionally checked e-mail. Mobile phones in particular are becoming ever more useful to entrepreneurs in those rural clusters in which other forms of communication are either limited or expensive.

The survey data can also explain, through use of a Logit Regression analysis incorporating several variables, why some enterprises have adopted the Internet.<sup>26</sup> It was hypothesized that enterprise size, the age and education of the entrepreneur, and collaborative arrangements with other firms might be the most important factors in the adoption of new technologies.

- The amount of finance made available for acquiring ICTs and maintaining a Web site was expected to be proportionate to the size of the enterprise.
- Younger entrepreneurs would presumably be more familiar with new technologies, and more likely to adopt them.
- Education-related factors—possession of IT skills, a knowledge of foreign languages, and a disposition for taking risks—would almost certainly have an impact.<sup>27</sup>
- The existence of strong networks of customers, wholesalers, and middlemen, who may already have embraced the Internet, would likely stimulate the diffusion of new technologies within the cluster through imitation, motivation, and pressure.

Other significant factors were land ownership (which could serve as security for a business loan) and gender—many women entrepreneurs are to be found in the handicraft sector, especially in silk weaving, garments, and accessories.

The results of the regression analysis (Table 4, Specification 1) indicate that an enterprise is more likely to use the Internet and create its own dedicated Web site if it is a large firm, with an educated female owner/manager selling directly to customers (hence the negative but significant value of the *middlemen network* variable). It appears that, contrary to expectations, neither the age of the entrepreneur nor the existence of a social network appears to facilitate adoption of Internet, although the latter has the expected positive sign. In Specification 2, a vari-

25. Bongmai Art Handicrafts Company (Bac Ninh Province) at [www.bongmaiart.com](http://www.bongmaiart.com). See also [www.dbav.org/news/732023](http://www.dbav.org/news/732023)

26. If the enterprise uses the Internet, the dependant variable value is one; if not, it is zero. For the rationale behind the selection of variables, see for instance Sandee and Rietveld (2001). A maximum-likelihood ordered probit analysis of the adoption of ICTs was also employed. The analysis provided similar, though not identical, results to the Logit analysis. However some of the observations were shown to be completely determined, suggesting that the results were inconsistent.

27. Kiiski and Pohjola further suggest that a university education is a highly significant factor (2001:13).

Table 4. Logit Regression Analysis of the Adoption of the Internet (e-mail and Dedicated Web Site) in the Red River Delta, by Selected Variables (2003)

Variables	Specification 1		Specification 2	
	Coefficient	(t-values)	Coefficient	(t-values)
Constant	-6.26	(-1.54)	-2.81	(-1.29)
Size (No. of Employees)	-0.13	(2.65)*		
Age of Entrepreneur	0.07	(1.03)		
Education	0.49	(2.27)**	0.38	(2.20)**
Gender (Dummy) <sup>1</sup>	-5.07	(-2.46)**	-3.64	(-2.22)**
Social Network (Dummy) <sup>2</sup>	0.67	(0.64)		
Middlemen Network (Dummy) <sup>3</sup>	-2.30	(-2.09)**		
Ownership of Land (m <sup>2</sup> )			0.004	(2.46)**
Log Likelihood	-15.693		-16.552	
Number of Observations	56		48	

\*Significance at 1% level

\*\*Significance at 5% level

1. If the entrepreneur is male, the dummy value is one; if female, it is zero.

2. If the entrepreneur disclosed a frequent exchange of ideas with their most important customers, wholesalers, and intermediaries, the dummy value is one; otherwise zero.

3. When entrepreneurs make sales through intermediaries, the dummy value is one; otherwise zero.

able was added denoting land ownership in square meters (available for only 48 enterprises).<sup>28</sup> Here we find that land ownership, education, and the gender of the entrepreneur are all important in explaining adoption of ICTs in general, and the Internet in particular.

An additional dummy variable (*rural*) was initially introduced, taking the value of one when the enterprise was located in the rural Delta, and zero when in Hanoi. However, this variable significantly reduced the explanatory power of the regression models and was eventually discarded. However, a Pearson correlation analysis of this variable with our dependent variable (adoption of the Internet) shows a negative relationship between them (-0.408; *P*-Value = 0.002), suggesting that enterprises based in the urban locale (Hanoi) are more likely to use the Internet than those located in the rural areas of the Delta.<sup>29</sup>

A number of external constraints on the adoption of ICTs are not explained by the variables. It was hypothesized that 12 such constraints (see Table 5) could prevent enterprises from either adopting, expanding, or improving ICTs. Of these, the most important are: shortage of capital (reported by 60%); lack of knowledge about the benefits of new ICTs, particularly the Internet and e-commerce (mentioned by 55%); and shortage of trained workers and poor market conditions (both mentioned by about one-third of the firms).

Provincial and local levels of government have been important sources of information and business support in Vietnam. From the interviews conducted, it seems that many enterprises consider local government to have supported them by providing cluster-specific technological information, as well as details of overseas markets and sources of finance.

28. Not all enterprises were willing to disclose how much land they owned. However, shortage of land was identified by some as being a serious obstacle to the adoption of ICTs and the expansion of the business.

29. The negative relationship between the adoption of ICTs and rurality was further confirmed by subjecting the data to a cluster analysis (not shown). Bearing in mind that such analysis could be a subjective exercise, three clusters have been identified. The first consists of 19 urban-based enterprises who are adopters of ICTs and are owned by an educated entrepreneur. The second comprises 14 rural businesses who are not adopters of ICTs and are headed by a young male entrepreneur of limited education. The third and final cluster consists of the remaining 23 rural enterprises, the majority of whom have adopted ICTs and are owned by well-established entrepreneurs, also of limited education.

**ADOPTION OF ICTs BY SMALL-ENTERPRISE CLUSTERS**

*Table 5. Enterprises' Major Constraints in Adopting, Expanding, or Improving ICTs\**

<b>Constraints</b>	<b>Ranking</b>	<b>Percentage of Positive Responses</b>
1 Shortage of capital	33	60
2 Lack of knowledge about the benefits of new ICTs	30	55
3 Shortage of trained workers	20	36
4 Poor market conditions	17	31
5 Provision of infrastructure (such as telephone lines)	15	27
6 Lack of good managers	13	24
7 Lack of incentives for adopting new technologies	12	22
8 Too much interference from local government	4	7
9 Shortage of electricity and energy	1	2
10 Unfair taxes	0	0
11 Unfair fees	0	0
12 Other (mainly land shortage or lack of appropriate software)	7	13

\*Enterprises were asked to identify 3 major constraints from the 12 listed in the questionnaire.

However, relatively few enterprises (16%, and mostly rural) approached their local government for support on technology. This suggests that entrepreneurs have the managerial autonomy to make decisions independently in adopting new technologies. A small number of entrepreneurs stated that the local government has been helpful in releasing land for the building of workshops and industrial estates. Others hinted that the scarcity of land is constraining their plans for expansion.

Overall, the sampled enterprises are highly optimistic about the future. The vast majority intend to expand their operation (including exports) within the next three years. Although few of them own a computer with Internet access, most expressed a desire to acquire one, and 31 businesses (55%) would consider creating their own Web site in the near future. These are significant developments, given Vietnam's long period of international commercial isolation and its lack (or suppression) of an entrepreneurial class (Hill 2000:283).

**The Red River Delta's Evolving Handicraft Clusters**

A number of proto-industrial handicraft clusters in the Red River Delta are gradually evolving into vigorous industrial districts. In the greater Hanoi area in particular, we observed an array of interlinked low-tech, but dynamic, handicraft clusters specializing in

ceramic production, silk making, stone-, horn-, and woodcarving, bronze casting, basket making, embroidery, and fine arts. Undoubtedly, the development and modernization of these clusters have been facilitated by infrastructure endowment in the form of roads, airports, ports and telecommunications, and the concentration of service providers such as financial institutions, information technology consultants, and freight forwarders.

The empirical investigation identified the enterprise cluster in the village of Bat Trang as one that is undergoing major revitalization. Its impressive growth, following the *doi moi* reforms of 1987, which aimed at dismantling barriers to trade, investment, and knowledge, is apparent from the frenetic building activity currently taking place, with the construction of new showrooms, workshops, and factory units. This is a considerable achievement, given that the local tradition of pottery making almost became extinct during the years of collectivization. Although the various businesses in the cluster still have much to learn in terms of marketing, exporting, product design, and quality, ICTs are gradually being adopted, and this is likely to further improve the situation. The largest enterprises now have well-designed Web sites, and though the smaller ones currently only use the Internet for communicating with customers, pressure exerted by those located overseas—who often ask to see a photograph of

the product on-screen before they will make a decision about a purchase—will in time make it standard practice for these smaller concerns to develop their own Web sites.

A number of firms in the Bat Trang cluster employ staff with well-developed artistic skills, as highly-sophisticated product designs are appearing. As a consequence, some are now producing ceramics for large American and European multinationals, such as Wal-Mart and IKEA. Our interviews established that the buyers and agents of many such foreign firms are playing an important role in the development of this cluster. They are making the adoption of new technologies (including ICTs) a necessity, and demanding new designs and improved quality. Even more importantly, they are facilitating Bat Trang's enterprises in gaining access to international trade networks.

Efforts to create a coordinating organization for joint marketing of the cluster's products (including the development of a common trademark and Web site) were recently made, with the establishment in 2002 of the Bat Trang Fine Arts Ceramic Association. However, as is clear from some of our interviews, not every entrepreneur in the village is keen to participate. This suggests that cooperative modes of behavior among the ceramics firms—a prerequisite in making Bat Trang a truly dynamic cluster—are not yet well developed. Moreover, linkages with supportive industries and institutions, especially in the area of design and packaging, are still weak.<sup>30</sup> The cluster also suffers from excess capacity, and urgently needs to utilize the thousands of skilled workers who are currently underemployed. Nevertheless, as noted by the United Nations Development Programme Resident Representative in Hanoi, the Bat Trang Village cluster is seen as a pioneering example of successful ICT-enabled development, despite the fact that its firms have a long way to go to fully integrate ICTs in their business strategy (Ryan 2003).

The Dong Ky woodcarving and furniture village is another example of a cluster that is becoming more dynamic due to significant export demand from international consumers. Some large exporters in the cluster are now taking overall responsibility for product finishing and quality control of all furniture des-

igned for exports. They are also embracing the latest ICTs, including mobile telephony and computer-assisted design. However, the latter is being adopted mainly by large private firms rather than the few cooperatives still to be found within the cluster. Generally speaking, the input of technology in the production process is rather limited. Only 20% of furniture is manufactured by machinery (although new equipment, such as kilns for drying wood, is slowly being introduced); the rest is largely made by hand, taking advantage of the cluster's available cheap labor. Because of land scarcity, the construction of a single large production plant has not been possible, and enterprises are thus organized in many small workshops and different production units scattered around the village. This fragmentation, coupled with an inadequate road network and ICT infrastructure, is seriously disadvantaging the cluster.

Most of the Dong Ky cluster's marketing activity is passive, taking place in the many large (and almost indistinguishable) furniture showrooms that litter the village's high street, as well as the additional outlet in Hanoi that many firms reported owning. But provincial and local levels of government have been rather more active in the development of the cluster, providing land and loans to businesses (both private firms and cooperatives) for the purpose of building an enterprise center on the outskirts of the village. The center, which is already near completion, consists of showrooms, workshops, and living spaces.

There is evidence that some inter-firm cooperation is taking place within the cluster. For example, it is common for many of the furniture makers to hire dry-wood facilities from other enterprises. However, the cluster's entrepreneurs are accustomed to competing rather than cooperating. A major producer of furniture, referring to the acutely competitive spirit of his fellow villagers, made the following comment:<sup>31</sup>

It was agreed by all of us in Dong Ky to share a stand at an important Chinese trade fair, but it soon became clear that every one of us was lowering the price of his furniture in order to undercut the others. In the end, it was the Chinese buyers, and not us, who benefited from the whole affair.

30. Interview material, Hanoi, August 2003.

31. Interview with Dong Ky on September 2003.

**ADOPTION OF ICTs BY SMALL-ENTERPRISE CLUSTERS**

*Table 6. Phone and Internet Subscribers in Vietnam (1999–2003)*

	1999	2000	2001	2002	2003
Fixed Line and Mobile Phone Subscribers (Per 1,000 People)	30.9	41.7	53.0	71.8	97.8
Internet Users (Per 1,000 People)	1.3	2.5	..	..	43.0

Source: World Development Indicators 2005)

The Van Phuc silk village could better be described as a static cluster. There is some growth, as evidenced by the village’s high-street commercial activities; between 20 and 30 shop outlets are to be found selling textiles, garments, and a wide variety of silk and other accessories to tourists and Vietnamese customers. However, shop displays are uninviting and the majority of the village’s entrepreneurs lack foreign language skills. Although fixed and mobile telephony is widespread within the cluster, use of computers and the Internet is still very limited. From interviews with local (mostly household) businesses, it was established that local authorities have been active in providing information on textile designs, but it was not possible to ascertain whether they have also been instrumental in encouraging producers to cooperate, and create synergies within the cluster. Nonetheless, they have recently approved construction of a production zone covering 14.6 hectares at the periphery of the village, which will house twice the number of textile machines currently in use.

Problems persist, however. Training facilities for upgrading workers’ skills (including those in ICTs) are inadequate, and up-to-date information on garment fashions and marketing trends is hard to come by. Moreover, the cluster suffers from poor working conditions, as well as environmental degradation due to water pollution from dyeing activities (MARD-JICA 2003:6–1) and noise pollution from the plethora of electric looms operating in cramped conditions. Nevertheless, the Van Phuc Silk Cooperative seems to be an appropriate institution for introducing ICTs for business-to-business transactions and e-commerce, and for facilitating adoption of ICTs by small textile and garment producers.

**Concluding Remarks**

The primary objective of the study, namely identifying whether ICTs can change the dynamics of small-enterprise clusters in Vietnam, has been partially

met. The qualitative evidence on the evolution of handicraft clusters in the Red River Delta suggests a link between adoption of ICTs and the growth of small-scale clusters, and explains how the presence of such technologies leads to changes in cluster behavior. However, the survey provides hardly any quantitative evidence to suggest that ICTs lead to changes in behavior, although it does reveal some of the constraints to greater utilization of ICTs, and identifies the type of firms that are likely to use them. Despite the generally positive findings of the survey as a whole, significant penetration of ICTs within the handicraft sectors of the Red River Delta appears to be very much limited to export-oriented enterprises based in urban or semi-urban areas, where Internet connectivity is relatively high. There is only a weak association between the adoption of ICTs by firms and stronger cooperation within a cluster. As Steiner (1998:6) suggests, it is difficult to test empirically whether a cluster is successful. He adds that clusters are open systems with a latent social ecology, and are thus difficult to evaluate quantitatively.

Table 6 shows the recent rapid increase in ICT usage in Vietnam. With regard to its adoption, the most striking feature of dynamism in some of the handicraft clusters examined here is not how extensive the adoption is, but how rapidly it is taking place. It is also possible that a certain threshold of adoption will need to be attained for benefits to materialize. Dynamic clusters with significant access to ICTs, such as those in Hanoi and Bat Trang, are likely to do business online with other such clusters at the expense of dormant ones. Increased access to ICTs, coupled with internationalization of production systems will, overall, expand the trading opportunities of dormant clusters.

The handicraft clusters in northern Vietnam are more than just industrial or economic arrangements; they are a part of a villages community, which is a social and political entity in its own right. Although

the clusters display elements of agglomeration economies, the more they assume a network-like character through the use of ICTs, the more they will benefit. ICTs not only promote local specialization, but also have the potential to contribute to the economic and social well-being of village communities and their development, especially when technology is made available in some sort of shared capacity, instead of being for the exclusive use of larger firms. Indeed, Internet cafés are already thriving, and community telecenters (based at local schools, community centers, and public libraries) are starting to appear.<sup>32</sup>

The conceptualization of small-cluster development is based on the efficacy of human capital and support institutions. Access to information through the new ICTs is an important condition for cluster advancement,<sup>33</sup> but such access is a constituent part of much broader policies undertaken at the national and/or local level. These policies aim to develop a special type of social capital and trust, as well as to facilitate the exchange of information and knowledge within clusters. The pessimistic view held in the past that “Vietnam is too far below the take-off point in the use of the Internet and the tools of the ‘new economy’” (VCIT 2001) is no longer valid. On the contrary, the last few years have seen a considerable upsurge of interest in ICTs within Vietnam, both in government and society at large.<sup>34</sup> It is also apparent that the broader adoption of such technologies will depend not only on the enterprises themselves but also on political institutions, business support associations, and educational establishments—all of these collectively shape the development, production, and usage of ICTs within a cluster.

In some of the small-enterprise clusters of the Delta, entrepreneurs face far more important challenges than lack of Internet access: these include inadequate road access, environmental degradation, shortage of capital and of educated workers, etc. For them, the non-adoption of ICTs is a symptom, rather than the cause, of the cluster’s stagnation. Adoption of ICTs is also being constrained by lack of understanding of the benefits they bring. One way of countering this problem would be for enterprise associations to play an active role in raising awareness of available technologies and their applicable uses, and to provide their members with IT training.<sup>35</sup> But even the most obstructive of all constraints—the lack of financial resources—could be largely overcome by developing the banking sector which will provide credit to enterprises, particularly household and small private firms. For their part, businesses (especially household enterprises) will need to clear organizational hurdles on the road to effective use of the Net and successful e-commerce.

There is no doubt that the Delta’s ancient tradition in handicrafts could be dramatically enhanced by the application of new technologies and the creation of local online markets. Electronic commerce in particular could bring greater opportunities to its clustered enterprises. It would allow them spontaneously to form networks and associations, and to connect to the world market. Such modernization would provide further employment, increase wealth and tax revenues, and make a positive contribution to Vietnam’s balance of payment. Moreover, in making it attractive to remain in local rural employment, it would help decelerate the trend toward urbanization and reduce the loss of the country’s most

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32. For instance, the province of An Giang in southern Vietnam is planning to open Internet centers in 36 communes, at which local administrative staff will have access to 50 Vietnamese language Web sites for information on local development (Vietnam News, 13 September 2003). Ho Chi Minh City plans, *inter alia*, to create 90 Internet centers in the city by 2006 (Vietnam News, 15 March 2004). The eLangViet project intends to build a network of specially staffed telecenters in eight villages within six provinces (eLangViet Feasibility Study 2004).

33. It is also likely that access to ICTs could cause the breakdown of the cluster, as geographic distance may not be the main barrier to information flow. For instance, firms that benefited in the past from geographical proximity might leave the locality and establish their business outside the cluster.

34. Vietnam is putting considerable effort into modernization and expansion of its telecommunications system, but its performance continues to lag behind that of its more modern neighbors (World Bank/MIGA 2003). In the Global Information Technology Report 2004–2005, covering a total of 104 countries and compiled by the World Economic Forum, Vietnam holds 68th position, up from 71st in 2003 ([www.weforum.org](http://www.weforum.org)).

35. The Vietnam Association of Rural Industrial SMEs (VARISME)—the first of its kind to operate in rural Vietnam—is an example of the kind of organization that could fulfil this role. Established in September 2002, and with more than 300 members, it focuses on the traditional labor-intensive handicraft sector.

## ADOPTION OF ICTs BY SMALL-ENTERPRISE CLUSTERS

valuable commodity—human capital—through migration.

Vietnam's foreign policy, which seeks membership in ASEAN's Free Trade Area, and the country's expected accession to the World Trade Organization are two powerful motives for its firms to adopt ICTs. In doing so, they would be able to take advantage of the greater export opportunities that would emerge. However, although the use of ICTs would enable Vietnam to participate fully in the emerging global economy, this might not be enough to sustain the country's remarkable economic growth. To this end, more reforms are urgently required; these will be difficult to achieve as the country would first need to address some complex domestic, political, and technical issues. As many observers have noted, fundamental reforms that could create a modern banking system, a responsible public administration, an equitable legal system, and a transparent Land Law are a much greater challenge than the government's main concern thus far, which has been to provide land to farmers (Dapice 2002; Dinh 2003; Conway 2004). Undoubtedly, in both urban and rural areas of Vietnam, the new ICTs and less sophisticated means of information dissemination—such as the ubiquitous loudspeakers, strident but nonetheless practical—will continue to coexist, at least for the foreseeable future. But the enthusiasm of many Vietnamese entrepreneurs for embracing the new technologies, together with the country's strong commitment to industrial modernization, brings genuine hope for the future, and could be inspirational to other developing countries. ■

## References

- Avgerou, C. (1998). How can IT enable economic growth in developing countries? *Information Technology for Development*, 8(1), 15–28.
- Bezanson, K., Annerstedt, J., Chung, K., Hopper, D., Oldham, G., & Sagasti, F. (1999). *Viet Nam at the crossroads: The role of science and technology*. Ottawa: International Development Research Centre.
- Ca, T. N., (2003). From gas to Internet in the revival of traditional ceramics/porcelain industry in Vietnam: The case of Bat Trang Village. Hanoi: NISTPASS.
- Chand, S., Runcan, R., & Quang, D. (2001). The role of institutions in the development of Vietnam. *ASEAN Economic Bulletin*, 18(3), 276–288.
- Cole, W. (1998). Bali's garment export industry. In H. Hill & T. K. Wie (Eds.), *Indonesia's technological challenge* (pp. 255–278). Canberra and Singapore: Australian National University and Institute of Southeast Asian Studies.
- Conway, T. (2004). Politics and the PRSP approach: Vietnam case study. Working Paper 241. London: Overseas Development Institute.
- Dapice, D. (2002, August). Helping Vietnam to make better choices: A discussion paper. Hanoi: UNDP.
- Dapice, D. (2003, May). Vietnam's economy: Success story or weird dualism?: A SWOT Analysis. Working Paper, Hanoi: United Nations Development Programme.
- Dinh, Q. X. (2003). Public administration and civil service reforms in Vietnam. In T. N. Bihn & C. D. Pham (Eds.), *The Vietnamese Economy: Awakening the Dormant Dragon*. London and New York: RoutledgeCurzon.
- Doanh, L. D. (2002). Leapfrogging into the ICT revolution: The case of Vietnam and the transitional economies. In C. S. Yue and J. J. Lim (Eds.), *Information Technology in Asia: New Development Paradigms*. Singapore: Institute of Southeast Asian Studies.
- Duc, L., Minh, N. N., & Vinh, N. C. (2003). *Soil Environments Affected by Copper Recycling Activities, Dai Dong Village, Van Lam District, Hai Hung Province, Vietnam*. New York: United Nations Economic and Social Commission for Asia and the Pacific. Retrieved from [www.unescap.org/esd/water/publications/cd/escap-iwmi](http://www.unescap.org/esd/water/publications/cd/escap-iwmi)
- Duc, V. V. (2000). Craft villages in the context of rural industrialisation and modernisation in Vietnam. *Vietnam Economic Review*, 67(3), 24–28.
- The Economist Intelligence Unit (EIU). (2002). *Vietnam country profile*. EIU.
- EIU. (2003). *Vietnam country profile*. EIU.
- eLangViet Feasibility Study. (2004, December). Retrieved from [www.elangviet.com](http://www.elangviet.com)
- Gainsborough, M. (2003). *Changing political econ-*

- omy of Vietnam: The case of Ho Chi Minh City.* London & New York: RoutledgeCurzon.
- Gainsborough, M. (2004). Ho Chi Minh city's post-1975 political elite: Continuity and change in background and belief. In B. J. T. Kerkvliet & D. Marr (Eds.), *Beyond Hanoi: Local government in Vietnam*. Singapore: Nordic Institute of Asian Studies and Institute of Southeast Asian Studies.
- Gibbs, D. (2001). Harnessing the information society? European union policy and information and communication technologies. *European Urban and Regional Studies*, 8(1), 3–84.
- Hill, H. (2000). Export success against the odds: A Vietnamese case study. *World Development*, 28(2), 283–300.
- Kerkvliet, B. J. T., & Marr, D. (Eds.). (2004). *Beyond Hanoi: Local government in Vietnam*. Singapore: Nordic Institute of Asian Studies and Institute of Southeast Asian Studies.
- Kiiski, S., & Pohjola, M. (2001). Cross-country diffusion of the Internet. Discussion Paper 2001/11. Helsinki: United Nations University World Institute for Development Economics Research.
- Kokko, A. (2000). *Structure, performance and reform requirements in the Vietnamese private sector*. Stockholm: Swedish International Development Cooperation Agency.
- Kokko, A., & Sjöholm, F. (2004, September 1–4). The internalization of Vietnamese SMEs. Paper presented at the 4th EUROSEAS Conference, Paris.
- Konstadakopulos, D. (2004). *Learning for innovation in the global knowledge economy: A European and South-East Asian perspective*. Bristol, UK and Portland, OR: Intellect.
- Konstadakopulos, D. (2000). Learning behaviour and co-operation of small high-technology firms in the ASEAN region. *ASEAN Economic Bulletin*, 17(1), 48–59.
- Lanjouw, J. O. & Lanjouw, P. (2001). The rural non-farm sector: Issues and evidence from developing countries. *Agricultural Economics*, 26(1), 1–23.
- MARD-JICA. (2003, February 24). Study on artisan craft development plan for rural industries in Vietnam. Progress Report. Hanoi: Ministry of Agriculture and Rural Development of Vietnam, and Japan International Cooperation Agency.
- Mekong Economics Ltd. (2003, January). *Vietnam development outlook*. Hanoi.
- National Statistical Yearbook 2002*. (2003). Hanoi: General Statistical Office.
- Ramamurthy, B. (2000). The non-state manufacturing sector in Vietnam 1991–97: An analysis of the winners. In P. Ronnas & B. Ramamurthy (Eds.), *Entrepreneurship in Vietnam*. Singapore: Nordic Institute of Asian Studies and Institute of Southeast Asian Studies.
- Red River Delta Master Plan. (1994a). Report 23, *Regional Economics*. Prepared by Binnie and Partners, Snowy Mountains Engineering Corporation Ltd, AACM International Pty Ltd, and Delft Hydraulics, and financed by the United Nations Development Programme for the World Bank. Hanoi: Ministry of Science, Technology and Environment.
- Red River Delta Master Plan. (1994b, May). Background Report 26, *Village Crafts*. Prepared by Binnie and Partners, Snowy Mountains Engineering Corporation Ltd, AACM International Pty Ltd, and Delft Hydraulics, and financed by the United Nations Development Programme for the World Bank. Hanoi: Ministry of Science, Technology and Environment.
- Ryan, J. (2003, October 1). Statement made at 3rd ICT Round-Table. Making ICT Applications Work for Development. Hanoi.
- Sandee, H., & Rietveld, H. (2001). Upgrading traditional technologies in small-scale industry clusters: Collaboration and innovation adoption in Indonesia. *The Journal of Development Studies*, 37(4), 150–172.
- Scott, A. J. (1994). Variations on the theme of agglomeration and growth: The gem and jewelry industry in Los Angeles and Bangkok. *Geoforum*, 25, 249–263.
- Scott, A. J. (2002). Regional push: Towards a geography of development and growth in low- and middle-income countries. *Third World Quarterly*, 23(1), 137–161.

## ADOPTION OF ICTs BY SMALL-ENTERPRISE CLUSTERS

- Sein, M., & Harindranath, G. (2004). Conceptualizing the ICT artifact: Toward understanding the role of ICT in national development. *The Information Society, 20*, 15–24.
- Steiner, M. (Ed.). (1998). *Clusters and regional specialisation*. London: Pion.
- Swierczek, F. W., & Ha, T. T. (2003). Entrepreneurial orientation, uncertainty avoidance and firm performance: An analysis of Thai and Vietnamese SMEs. *The International Journal of Entrepreneurship and Innovation, 4*(1), 46–58.
- Thoburn, J. (2004). Globalization and poverty in Vietnam: Introduction and overview. *Journal of the Asia Pacific Economy, 9*(2), 127–144.
- Tiene, D. (2002). Addressing the global digital divide and its impact on educational opportunity. *Education Media International, 39*(3/4), 1–12.
- United Nations Conference on Trade and Development (UNCTAD). (2003). *E-commerce and development report 2003*. New York and Geneva: United Nations Conference on Trade and Development.
- United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP). (2003, September 18–19). Development of enabling policies for trade and investment in the IT sector of the Greater Mekong Subregion: Vietnam. Report prepared by K. J. Joseph for UNESCAP. Presented at the National Workshop on the Development of Enabling Policies for Trade and Investment in the IT Sector of the Greater Mekong Subregion.
- United States Agency for International Development (USAID). *Bat Trang Ceramic Competitiveness Strategy*. Hanoi: USAID.
- Vang, N. T. (2003). To step up export of ceramics to the US market. *Vietnam Economic Review, 105*(5), 26–30.
- Vietnam-Canada Information Technology (VCIT) Final Report. (2001). Vietnam-Canada information technology project 1995–2001. GAIA Corporation. Retrieved from [www.gaia.ca/vcitfinalreport.htm](http://www.gaia.ca/vcitfinalreport.htm)
- Vietnam Competitiveness Initiative (VNCI). (2003 May). Bat Trang ceramics competitiveness strategy, Final draft report. Hanoi: VNCI.
- Wheatley, C. (2001, October 2–5). Fostering innovation in urban and peri-urban based clusters of small-scale agrifood enterprises. Paper prepared for the Workshop on Appropriate Methodologies for Urban and Peri-Urban Agriculture Research and Planning at the RUAF/SIUPA conference, Nairobi.
- World Bank. (2002, November 21). Report No. 25050-VN, *Vietnam Delivering on its Promise. Development Report 2003*. World Bank.
- World Bank. (2005, July). *Vietnam Data Profile, World Development Indicators Database, 2005*.
- World Bank Report Group. (2002, June). Accelerating information and communication technologies development in Vietnam, Report.
- World Bank/MIGA. (2003). *Benchmarking FDI competitiveness in Asia*. Washington, DC: The World Bank Group/MIGA.
- World Economic Forum. *Global Information Technology Report 2004–2005*. Retrieved from [www.weforum.org](http://www.weforum.org)
- Yusuf, S. (2003). *Innovative East Asia: The future of growth*. Washington, DC: The World Bank.
- Yusuf, S., & Evenett, S. (2002). *Can East Asia compete? Innovation for global markets*. Washington, DC: World Bank and Oxford University Press.

## Appendix 1

*Which of the following Information Communication Technologies do you normally use for making contact with your most important customers? (Please tick more than one if necessary.)*

1. My own fixed/mobile telephone [ ]
2. I do not have my own telephone, but I have the opportunity to share a telephone with (provide a name) \_\_\_\_\_ [ ]
3. I have a personal computer with dedicated Internet access for making contact with my most important customers [ ]
4. I do not have my own Internet connection but I have the opportunity to share with others or use an Internet Café [ ]
5. I have my own dedicated Internet site [ ]

*Which of the following constraints prevent you from adopting/expanding/improving ICTs (please choose only three).*

1. Shortage of capital [ ]
2. Shortage of trained workers [ ]
3. Lack of knowledge about the benefits of new ICTs (i.e., Internet and e-commerce) [ ]
4. Shortage of electricity and energy [ ]
5. Provision of infrastructure (i.e., telephone lines) [ ]
6. Lack of good managers [ ]
7. Lack of incentives for adopting new technologies [ ]
8. Poor market conditions [ ]
9. Too much interference from local government [ ]
10. Unfair taxes [ ]
11. Unfair fees [ ]
12. Other (please specify) [ ]

## Appendix 2

During the last year have you undertaken joint cooperation with another local enterprise? Yes / No

How often does your company exchange ideas with your most important customers/wholesalers/intermediaries?

- (a) Often [ ]
- (b) Occasionally [ ]
- (c) Never [ ]

## Appendix 3

*How often have you sought help and advice from local government on the following issues?*

- |  | Often | Occasionally | Never |
|--|-------|--------------|-------|
| 1. Acquisition of new technology                   | [ ]   | [ ]          | [ ]   |
| 2. Marketing product beyond my local area          | [ ]   | [ ]          | [ ]   |
| 3. Dealing with banks (new loans and rescheduling) | [ ]   | [ ]          | [ ]   |
| 4. Dealing with senior levels of government        | [ ]   | [ ]          | [ ]   |