

REGIONAL TOURISM NETWORKS: THE NEXUS BETWEEN ICT DIFFUSION AND CHANGE IN AUSTRALIA

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This article reports the outcomes of a study on the nature of the change process when a regional tourism network seeks to adopt e-commerce. The study builds on Rogers' seminal work on the diffusion of innovations and makes a unique contribution to existing ICT diffusion studies by its focus on the nature of the network links and by its application of an action-oriented methodology to untangle the effects of the embedded network structure. The study suggests a strong relationship between diffusion and network positioning, both in terms of place (status and position in the network) and space (the geographic make-up of the network). Diffusion additionally hinged on network cohesion and actors' trust in and engagement with the network.

Key words: Tourism networks; e-Commerce; Collaboration; Learning; Social capital; Trust; Change

Introduction

The push towards networked information and communication technologies (ICT), combined with increased customer expectations, has put extraordinary pressure on the information-centric and service-based tourism industry to extend conventional distribution channels to include the Internet as a major new marketing channel (Bloch & Segev, 1996). To date, most research into the implications of the Internet for micro and small tourism firms has focused on individual business barriers to ICT adoption, with a propensity towards the adoption of online booking systems (Buhalis, 1999; Evans & Peacock, 1999). Such research has shown that

small and medium size tourism enterprises (SMTE), much like other SME, tend to be time and resource poor, with their size being their main disadvantage vis-à-vis ICT adoption (Werthner & Klein, 1999). Other barriers that have been identified include technology itself, while the lifestyle choice of owner-operators often entails a negative attitude towards ICT (Evans & Peacock, 1999). Being located in peripheral regions where the ICT infrastructure, especially broadband, is either inadequate or prohibitively expensive due to limited demand (Anckar & Walden, 2002) and the education and professional background of owner-operators have also proven to be significant barriers (Ateljevic, Milne, Doorne, & Ateljevic, 1999).

There appears to be widespread consensus that industry preparedness in terms of ICT and e-marketing skills and training falls well short of the requirements to operate within a now ICT-driven sector (Baines, 1998; Danielle & Mistilis, 1999; Hollick, 2003; Jameson, 2000). As Evans, Bohrer, and Richards (2001) have noted, small tourism firms may well remain lost in the electronic marketplace unless they are assisted in the usage of ICT tools and acquire the skills needed to participate in the digital economy.

Keeping up with rapidly changing marketing trends is a challenge for all firms but is particularly confronting for resource- and time-poor SMTE. Despite a discernible increase in online presence of entrepreneurial SMTE (Buhalis, 2002), many SMTE have not been up to the task of marketing themselves online. As individual enterprises with limited marketing budgets, most small firms still underestimate the value of ICT and electronic marketing channels (Werthner, Nachira, Orests, & Pollock, 1997). To add complexity, while connectivity has the potential to increase small tourism firms' visibility in the marketplace, a micro-tourism Web site is easily overshadowed by the plethora of mega-sites such as Expedia and Travelocity available to cyber customers. To counter this phenomenon, a SMTE aggregation argument may be made for the use of ICT to develop joint e-marketing and e-commerce initiatives (Braun, 2002). A number of studies have shown cooperative marketing can add value to a destination e.g., Morrison, 1998; Palmer & Bejou, 1995; Palmer & McCole, 2000; Williams & Palmer, 1999), although traditionally such cooperation was restricted to the production of joint marketing brochures and shared stands at trade shows.

In a survey study conducted among small tourism firms in England, respondents from both the macro (destination) level and STME level indicated that they could see the potential benefits of using Web technologies for marketing purposes (Main, 1999). An action research project undertaken with small tourism firms in North London similarly showed that the development of a shared destination Web site proved to be attractive to local tourism operators in terms of joint marketing and securing new business with the greatest interest in networking coming from those businesses that had the strongest links to the local economy. However, the project also highlighted the firms' relatively underdeveloped knowledge of ICT

itself and a varying degree of reluctance within the sector in terms of joining a network (Evans & Peacock, 1999). Nonetheless, Evans and Peacock argue that, to counteract global distribution system (GDS) isolation of SMTE, local destination networks should integrate ICT-based networking and cooperative marketing strategies. Besides, as Anckar and Walden (2001) posit, a network or information technology infrastructure is essential to bring small tourism firms and cyber customers together, as well as to increase the willingness of cyber customers to purchase tourism products from smaller suppliers.

While the aforementioned studies provide valuable insights into the necessity for and small firm willingness to adopt cooperative marketing practices in an online environment, notable research on supply-side change processes pertaining to ICT adoption in a network context and studies on network use of the Internet as a cooperative marketing and e-commerce tool remain in their infancy (Beckendorff & Black, 2000). As Evans et al. (2001) have pointed out, "there is a particular need for empirical research at the destination level to explore in greater detail the local tourism economy and ICT impacts—supply chain links, training and related organisation development needs, as well as the wider market and 'local-global' relationships" (p. 152).

This study, which investigated the nature of the change process when a regional Australian marketing network seeks to adopt ICT and e-commerce, provides some initial insights into network relationships vis-à-vis ICT diffusion and global positioning. An aim of the study was to determine how the change process differed in the face of incremental change (adding some e-commerce solutions to the network) or radical change (changing the overall business model). The study builds on Rogers' (1995) seminal work on the diffusion of innovations and makes a unique contribution to existing tourism-related ICT diffusion studies by its focus on the nature of the network links as the unit of analysis, and by its application of an action-oriented methodology to untangle the effects of the embedded network structure on diffusion.

Diffusion of Innovations

The diffusion of innovations research field has been covered by many scholars in a variety of disci-

plines, but Rogers' (1962, 1995) work—which analyzed the process of diffusion, and mapped the impact of a combination of social, economic, and technical forces on that process—has made a seminal impact and still stands as the dominant model in the field.

Rogers (1995) describes the characteristics of an innovation, or the elements that impact on the adoption and diffusion of same, as closely linked to the degree of difficulty, need, experimentation, visibility, and relative advantage perceived by potential users in adopting the innovation; and the social system(s) and communication channels adopters are linked to. Cost and time also play a role in the adoption process, in terms of available resources for the former, and the relative earliness/lateness with which an innovation is adopted in comparison to other members of a (social) system for the latter.

When the diffusion of an innovation is a planned or centralized change process, it often involves a change agent. Generally the mission of a change agent is a social marketing one to create intent in the client to change and to help translate that intent into action (Burnes, 1996). Clients are usually opinion leaders, who are typically most cosmopolite within their social system and who have a propensity to influence the broader population. When the diffusion of an innovation is unplanned, or decentralized, the adoption is considered an emergent change process, whereby the decision-making processes of the adopter play a significant role (Rogers, 1995).

Because the process of adoption is an information-seeking and information-processing activity, the adopter's information channels or interpersonal networks play an important role in the adoption process. Mass media are said to be more important in the knowledge-seeking phase, while interpersonal channels are deemed more important at the persuasion stage (Kautz & Larsen, 2000). While interpersonal diffusion networks are often homogeneous in nature, heterogeneous networks are believed to positively influence adoption. As Granovetter (1973) has demonstrated in his seminal work on the strength of weak ties, interpersonal heterogeneous network links are important in obtaining new information. Network ties are defined as either strong or weak, depending on the level of interactivity, emotional intensity, and reciprocity that takes place between actors. While

homogeneous links spread an innovation horizontally, heterogeneous links reportedly speed up vertical diffusion (Rogers, 1995).

Past diffusion research has generally investigated single innovations, such as the television. ICT encompasses a series of separate yet interrelated components [e.g., electronic mail (email), the Internet, the Web, and e-commerce] that can be adopted in a variety of social and business settings. It has hence been suggested that ICT cannot be considered as a single technological innovation, but rather as a series of (process) innovations, potentially resulting in variable diffusion patterns (Walczuch, Van Braven, & Lundgren, 2000). While Rogers (1995) introduces the concept of "technology clusters," one or more interrelated elements of technology that are adopted in context, with one innovation influencing an individual's perception of the next innovation, his later work on the diffusion of new technologies does not identify ICT as a set of multiple innovations (Rogers, 1997). It has further been suggested that diffusion of innovation researchers consider that complex ICT solutions should be understood as socially constructed and learning-intensive artefacts, which can be adopted for varying reasons within volatile diffusion arenas (Lyytinen & Damsgaard, 2001).

A careful perusal of Rogers' (1995) in-depth comparison of the major diffusion research traditions, which includes a cross section of disciplines, revealed predominant use of quantitative research methodologies, measuring in the main the rate of adoption and/or the speed of diffusion. While such studies generate important data, they do not adequately capture the change process that leads to an innovation such as ICT being adopted or rejected. Action research (AR) is an intervention process that is collaborative in nature, as it aims to work with stakeholders rather than on them (Reason & Bradbury, 2001). The participatory, experiential, political, and action-oriented nature of action research addresses the very learning and change processes the study was interested in exploring.

Change has no particular arrival point and is driven by a number of factors (e.g., new technologies, new markets, political pressures, customer preferences, and social expectations). To compete in the networked economy, it is argued that companies, networks, and regions need to be open to learning and

change to stay fluid in their innovation and strategic planning processes (Earl, 2000; Senge et al., 1999). Learning and change are hence closely intertwined. Network learning is contingent on the network structure, cohesiveness of and commitment to learning by network actors (Chisholm, 1998). Competitive advantage for SMTE (Ryhänen, 2003) and positive change can ensue when network actors' needs are met, trust is built, and committed interest to the learning network is present (Tell, 2001). In this study, ICT diffusion within the network was considered in terms of trust in and engagement with the network and commitment to learning and change.

Research Design

The study took place in the State of Victoria. Tourism network formation in the form of cooperative tourism marketing has been in place in Victoria since a Regional Cooperative Marketing Program (RCMP) was set up by Tourism Victoria, the state's peak tourism body, in 1993 as part of its strategic direction to develop integrated marketing campaigns for all its Product Regions and attain competitive advantage through regional cooperation (Tourism Victoria, 1993). Each Product Region in Victoria has a Campaign Committee, made up of representatives from local government, institutions, and industry. The Committee is responsible for the marketing of the Product Region and maintaining communications with tourism industry stakeholders in their region. Membership on the Committee is voluntary.

The study evolved out of a consultancy project undertaken with The Grampians Region Product Campaign Committee ("the Committee"). The Grampians are considered one of Australia's renowned tourism attractions, drawing in excess of 1.2 million visitors annually. The current boundaries of the Grampians Product Region, as defined by Tourism Victoria, cover a vast geographical area stretching hundreds of kilometers across a diversity of landscapes and nature-based tourism experiences including several national parks, rivers, lakes, wetlands, and desert. The Grampians Product Region embraces seven major townships, numerous villages, and seven local government shires. At the time of the study there were approximately 900 geographically dispersed tourism operators in the Grampians network. A total of 20 actors participated in the study,

representing local government actors, state government actors, industry actors, and other domain actors who performed a role for, or had an affiliation with, the Committee.

A variety of public and private tourism Web sites have emerged in Victoria in recent years. These Web sites range from a State tourism portal with full booking facilities developed by Tourism Victoria, to a series of regional Web portals developed by cooperative marketing bodies, to a score of private destination Web sites. As part of its new media marketing strategy, the Committee decided that it needed to upgrade its basic Web site and transform it into a comprehensive e-commerce and e-marketing site (The Ascet Group, 2000). The Committee was interested in creating an innovative e-commerce and e-marketing portal to increase the number of visitors to the region. Increased visitors to the region would have direct and accountable business results for the local industry. Another aim of the Committee's new media marketing plan was to provide the approximately 900 tourism operators geographically dispersed throughout the Grampians Product Region with an affordable Web presence that they could market and evolve in their own right.

Being unfamiliar with Web site design, the Committee approached the researcher to consult, in tandem with its marketing agency in charge of producing Grampians collateral, on an appropriate portal model. Being both a researcher and a practitioner on an ICT innovation project, an AR methodology was proposed, and endorsed by the Committee, as AR is collaborative in nature and flexible enough to meet the emerging issues of technology-related change. An AR intervention would create stakeholder ownership in the portal model and facilitate the tracking of the change processes within the tourism network vis-à-vis ICT diffusion.

While adopting an AR methodology had many potential benefits, there were also some limitations to consider. It required a diligence on the part of the action researcher to combine professional responsibilities with involvement in a collaborative relationship (Levin, 1999). The researcher might experience difficulty monitoring the change processes, especially if actors were unwilling to be reflexive, were to limit access, or were to decide to abandon the process altogether. Because "the researcher's skills in gathering and analysing data were the primary

bases for the quality of the outcome” (Schein, 2001, p. 228), rigorous recording of the organization’s sociotechnological change processes was required. The work undertaken with the regional tourism body had, by its very nature, a pro-innovation bias. As a facilitator of ICT adoption and a potential change agent of the process, the researcher’s personal pro-innovation stance and partiality towards the adoption of a particular portal design also needed to be taken into account.

Generally, an action research intervention consists of cycles of action and reflection. Grounded in practice, cycles are designed towards development of understanding and practice as the cycling evolves (Bradbury & Reason, 2001). In formulating the appropriate action research mix as the basis of the study, issues such as client-centered intervention and outcomes (Schein, 1997), collaboration, a domain-oriented scope (see, e.g., Finsrud, 1999), and the researcher’s position within the research frame were closely considered. Action research is an emergent process and designing such a process is often considered incongruous with the nature of the intervention (Van Beinum, 1999). An overarching portal development approach was nonetheless adopted to provide starting conditions for the consultancy/research process, whereby the intention was to involve as many network actors as possible in a dynamic learning and change cycling process. The intervention actions proposed to actors were:

- to make time to meet with the consultant in their respective shires for a reconnaissance conversation;
- to collect regional stakeholder e-commerce inquiries in their respective shires for an period of approximately 3 months prior to the design phase of the portal;
- to participate in a 1-day search conference (forum) to collectively formulate an initial e-commerce model for the product region;
- to take part in follow-up communication to finalize the portal model.

Transcripts of reconnaissance conversations were returned to actors for reflection purposes. After the completion of the intervention all electronically available data—such as email messages, audio-taped conversations, field and journal notes, ICT and tour-

ism policy documents, speeches and other pertinent documentation—collected during the course of the intervention were aggregated into a qualitative software program for data analysis.

The analysis framework included recurring themes in the network diffusion (Rogers, 1995), network ties (Granovetter, 1973), trust (see Braun, 2002), and ICT diffusion literature (Kautz, 2000; Lyytinen & Damsgaard, 2001). Issues such as connectivity, communication channels, and network positioning were examined both as separate and interrelated components from an individual, group, and domain perspective. The individual perspective focused on the views of individual actors on the Committee. The group perspective referred to the Committee as a whole. The domain perspective involved a wider set of actors including Grampians-based tourism operators and members of public institutions and/or industry organizations that shared direct or indirect network interests. In reporting on the change processes *via-à-vis* ICT diffusion and the adoption of e-commerce in the regional tourism network, pertinent domain results are summarized below.

Study Results

Overall, a low level of engagement by domain actors was recorded. While a number of concerns were voiced during the individual discussion phase, actors appeared unwilling to carry their concerns forward into the larger group. Interest in the search conference and subsequent portal model refinement phase dropped dramatically and actors proved unresponsive to sustained collaborative exploration, action, and reflection. The latter appeared to be underpinned by a prevailing Committee culture of not wishing outsiders to meddle in its business, compounded by a lack of time and commitment to the process due to actors’ volunteer status on the Committee.

As a group, the Committee displayed a low degree of knowledge and interest in learning about ICT, e-commerce, and the development of the portal. Although the Committee had commissioned an upgrade of its Web presence, Grampians actors appeared too new to ICT to have a strategic portal vision. Web development and electronic marketing were classified as project management tasks and subsequently outsourced. Actors were responsive to

the researcher's bridging capital in the form of Web expertise, but only when it was presented under the banner of marketing agency work. The aggregation of domain complementarities or any other potential value added that might have been established along the regional value chain remained unrecognized and hence untapped. With sustained dialogue between the Committee and the researcher primarily occurring via the marketing agency, it proved most productive for the researcher to use the agency's central position in the network as the conduit for action. While the marketing agency helped facilitate the adoption of a portal design, domain actors' lack of an ICT vision and low level of participation in the cyclical action-reflection processes prevented actor "ownership" of the portal.

The vast geographical make-up of the Grampians product region proved to be a core determinant in the domain's decision-making processes. The domain's collateral was centered on a single icon, Halls Gap, the region's main destination and access point to the Grampians mountain range. Paying less heed to marketing the region's diverse attributes left outer region stakeholders feeling alienated. Apart from being "too Halls Gap focused," actors also voiced concerns about the marketing organization not being owned by operators. With network marketing in the hands of a few core actors protecting their vested interests, outer shire actors did not feel that they were part of the regional community and that their interests were fairly represented. Instead, the product region was described as a "community of disinterest" with a big rock in the middle, where every one ran their own show; competition and distrust were rife, and genuine efforts towards domain cooperation and collaborative learning that might have contributed to change were, as exemplified in this study, merely paid lip service. Despite the rhetoric espoused that the portal would become the primary network structure for regional communication, after its launch the portal was not used for either horizontal communication between Committee actors or vertical dissemination of information along domain tiers. Not surprisingly, ICT alone could not permeate subregional cooperation barriers or foster an inclusive network culture.

The study indicates that embracing portal technology is a complex and phase-based process in itself. While email had indeed become the standard

communication method for internal Committee business, it had not yet ubiquitously been adopted as the external mode of communication with industry actors across the domain. In examining connectivity through conversation and email traffic analysis, it became apparent that institutional actors with work-related access to network infrastructure were markedly more "connected" than industry actors. Contextual factors, many in existence prior to ICT adoption, such as domain actors possessing (access to) ICT knowledge, infrastructure, skills, and time, played a significant role in adoption patterns across the domain. Not only did the portal not address the needs of regional stakeholders, as Applebee, Ritchie, Demoor, and Cressy (2002) observed elsewhere in Australia, many tourism operators have yet to come to terms with the dominant Web-based functionalities of product information and promotion. The research further indicates that both the hard technology (the telecommunications infrastructure that underpins the uptake of ICT) and the soft technology (the formal and informal skills and knowledge required for the uptake of ICT) remain inadequate. In addition, anecdotal evidence suggests that the smorgasbord of Web offerings only added to operator indecision and perhaps even to technology aversion. Portal and Web site initiatives undertaken either within or impacting on the domain (e.g., initiatives on both the state and regional level) were top down and technology driven, leaving domain actors to cope with ICT confusion, cost issues, and no sense of belonging.

While the majority of domain actors were aware of the Web, neither institutional actors nor industry actors had progressed to the e-commerce phase, suggesting that adopting e-business technologies is an evolutionary process that requires the negotiation of a journey that involves continuous learning and change. Rogers (1995) acknowledges the evolutionary process in terms of attitudinal change and time required for the innovation-decision process, but omits codified and tacit skills, prior experience and learning as part of that process. Adoption of the entire cluster of ICT technologies may be viewed as a linear process along an adoption continuum (Fig. 1). After adopting email, the Web is the second step for adoption consideration, e-commerce the third step, potentially followed by adoption of a complete e-business model at which point we may speak of complete ICT diffusion or an ICT paradigm shift.

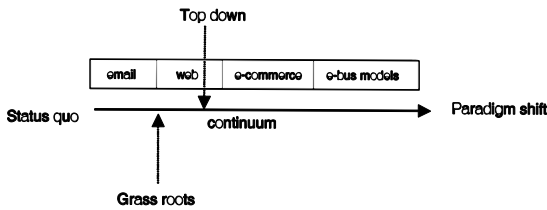


Figure 1. ICT adoption continuum.

As described by Rogers (1995), in “normal” diffusion networks institutional actors would have served as change agents in the adoption process. However, in this particular network, institutional actors did not use the existing communication channels to transfer knowledge or act as change agents, resulting in vastly underutilized interpersonal communication channels across the domain, which negatively impacted on and politicized the ICT adoption process. Instead, communication was equated with marketing and tended to be a unilateral rather than an interactive and iterative process. Actors repeatedly cited poor upstream and downstream information flows across the domain, pointing to embedded points of power in the domain obstructing communication flows. Here the relationship between the network and ICT diffusion may be viewed as reciprocal, with central network actors markedly constraining and bounding network diffusion opportunities. Possibly compounded by digital illiteracy, lack of resources, and a lack of understanding of the potential strength of interactive communication across domain strata, the preservation of poor communication channels politicized the ICT diffusion process.

Adoption and diffusion of ICT and e-commerce was further obstructed by domain actors’ parochial worldview, outsourced responsibility for the product region’s strategic and operational ICT vision, no accountability for the domain’s ICT developments, and lack of commitment to change. Volunteer membership on the Committee was frequently mentioned as a key barrier to network innovation, as were prioritization of individual and subregional interests, and the domain’s power structure. With its factional power base preserving vested interests, actors lacked both the infrastructure and commitment to change. Without exogenous pressure on endogenous network

relationships, central network actors shaped domain development prospects as they saw fit.

In considering the ad hoc approach to ICT adoption and diffusion within the network, the study suggests a strong relationship between diffusion and network positioning both in terms of place (e.g., actor status and position in the network) and space (e.g., the geographic make-up of the network). The Grampians history and the vast boundaries of the current Grampians product proved to be pivotal factors that influenced tourism network cohesion, actors’ trust in, and engagement with, the network. The latter in turn influenced the scope of ICT diffusion within the product region and its approach to global positioning.

In the course of the analysis it became clear that resistance to change was a central issue in the domain. In an environment of disconnected networks with no commitment to learning, there was no perceived need for change. Domain actors appeared oblivious that they, themselves, were part of the transition to a knowledge economy and that information sharing and collaborative learning might positively influence their product region. Conversely, the introduction of ICT did not alleviate lack of information flows across subregional boundaries, alleviate spatial network constraints, or enhance domain relationships. Adding e-marketing and e-commerce capability to the cooperative marketing structure did not noticeably change or augment SMTE interest in cooperative marketing in the domain. Despite the introduction of some e-commerce solutions into the network, the resistance to change negatively impacted on the awareness creation and the adoption of incremental ICT solutions in the domain. Network relationships and the evolutionary nature of ICT adoption precluded the option of the network adopting and embracing a radical new e-business model.

Discussion

In reviewing the study results and positioning them alongside Rogers’ (1995) seminal work on the diffusion of innovations, some interesting comparisons can be made. Relevant diffusion components are discussed below and an overview of the comparison between Rogers’ diffusion framework and the study’s diffusion framework is reflected in Table 1.

Table 1
Comparison of Diffusion Frameworks

Rogers' (1995) Diffusion Framework	Study's Diffusion Framework
Quantitative methodology	Action research methodology
Elements of diffusion: innovation, communication channels, social system, time (p. 10)	Elements of diffusion: innovation, communication channels, social system, time, context (network place, space, power, trust; worldview and commitment)
Unit of measurement number of links within the network (p. 23, p. 308)	Unit of measurement nature of links within the network
Social system engaged in joint problem-solving to accomplish a common goal (p. 23)	Social system inhibited goal setting and joint problem solving
The social system constitutes a boundary within which an innovation diffuses (p. 24)	Social system boundaries controlled by stakeholders; no bridge between social systems
Assumes access to centralized and decentralized communication channels (p. 364)	Centralized and decentralized communication channels were ineffective
Communication patterns assumed to be interactive (p. 288, p. 308)	Communication was unilateral
Patterned flows of information in a communications network affect the diffusion of an innovation (p.26)	The network structure determined the communication flows; information flows were controlled by central actors
Trust implicit in communication channels (e.g., absent in text)	Absence of trust in network inhibited information flows
Diffusion occurs in fluid, linear maturation phases (p. 162)	Diffusion occurred in a chaotic manner
Homogeneity slows down diffusion; diffusion strengthened by weak ties (p. 308)	Heterogeneity did not appear to speed up diffusion; diffusion seemed weakened by weak ties
Opinion leaders and change agents influence change (pp. 330–335)	Actors own change agents; no centralized or decentralized commitment to change
Social learning single reference to learning (p. 330); collective learning and reflexivity undefined (e.g., absent in text)	Innovation & change impeded by worldview and lack of commitment to collaborative learning and reflexivity
Diffusion success is measured by rate of diffusion and critical mass (p. 313, p. 339)	Diffusion success obstructed by contextual factors, critical mass was not attained

The study's diffusion patterns reflect both the unit of measurement (the nature of the network links) and the action research methodology (the process applied to help untangle the effects of the embedded network structure) that I adopted for the study. They necessarily differ from linear and graphical diffusion frameworks that typically determine the number of network links via quantitative methods. These results should not be construed as a criticism of Rogers' work, but rather as an extension of the existing theoretical framework.

Rogers (1995) typifies diffusion networks as social systems in which actors are engaged in interactive communication for joint problem solving and the accomplishment of common goals. Describing a complete lack of communication in a system as a

rare phenomenon, Rogers generally assumes centralized and decentralized communication channels to be available for information-rich exchanges. His framework further suggests that reciprocal ties exist between actors.

In the Grampians network both horizontal (internal) and vertical (external) weak ties negatively influenced the ICT diffusion process. With knowledge transfer channels towards domain connectivity being vastly underutilized, or in some cases obstructed, a chaotic ICT adoption pattern occurred across the domain. The latter is noteworthy in that the diffusion of innovations literature does not generally untangle the effects of the embedded network structure on the diffusion process and hence few, if any, diffusion studies will have previously found a diffusion process to be chaotic.

In discussing the weakness of high-proximity homogeneous ties vis-à-vis information flows, Rogers cites the Granovetter (1973) theory on the strength of (heterogeneous low-proximity) weak ties as being “of central importance in the diffusion process” (Rogers, 1995, p. 310). The Grampians network was characterized by weak social capital and limited structural bridges between social systems. Barriers to diffusion seemed to stem from internal organizational dynamics of the network, the lack of convergent goals of individual and group actors, and the top-down approach to ICT policy from key government bodies. Despite industry homogeneity, relationships were heterogeneous in nature, with actors operating in geographically dispersed and divergent cultures. The geographic make-up of the network (space) contributed to network communication channels being vastly underutilized as information exchange conduits. The systemic norm of outsourcing structural bridge and domain building compounded ineffective communication exchange. By equating communication with marketing, unilateral or broadcast-type communication was standard across domain strata. Because communication was unilateral and noninteractive, it lacked meaning and was static and nonemergent in nature.

Access to information was dependent on actors’ exclusionary communication practices and position in the network structure. The importance of network positioning (place), and especially of closeness to centrality in the network, has long been of interest to researchers (Freeman, 1979). In this study, those actors occupying close centrality positions in the network used their status and strong “old boy” network ties to restrict domain knowledge flows and to control communication channels. The Gaventaa and Cornwall (2001) observation that the hidden face of power is as much about keeping actors and issues from getting to the table as it is about control over the (domain’s) learning processes was highly relevant to this study.

In their recent article on the social side of creativity, Perry-Smith and Shalley (2003) provide a useful discussion on network ties. Based on the work of Coser, the latter researchers argue that weak ties are believed to facilitate autonomy, a structure that certainly appeared to suit both institutional and industry actors disinterested in domain convergence. The researchers further describe long-term central

network actors with strong ties as likely being entrenched in status quo positions. Central actors apparently have difficulty breaking free of their Web of ties and seeing beyond them to new ideas. In this study, certain domain actors’ long-standing central positioning may have perpetuated actors’ parochial worldview, which in turn may have constrained the diffusion process. There is also some evidence in the tourism literature (see Pavlovich, 2003) that incremental change strengthens existing power structures within a network. In the studied domain, central actors may have wished to slow down the e-commerce diffusion process by intentionally obstructing communication channels and avoiding the forging of strong ties with noncentral actors.

Rogers’ diffusion framework does not specifically address trust-based issues vis-à-vis the seeking of information that leads to the adoption of an innovation. Rogers (1995) simply argues that later adopters seek out early adopters for advice, which suggests implicit trust in said communication channels. In the study’s network, cultural divergence resulted in closed communication constructs, with neither centralized nor decentralized domain actors seemingly prepared to function as referents or change agents. Consequently, diffusion occurred in an ad hoc and chaotic manner and it is hence argued that in this study heterogeneity and weak ties appeared to slow down or weaken the diffusion process. This finding differs markedly from Rogers (1995), who posits that heterogeneity and weak ties speed up diffusion.

Concurring with Rogers, Bouty (2000) found that actors freely shared information with weak ties, as long as the information was not too complex or proprietary. Such studies may suggest that large numbers of weak ties would be conducive to diffusion. However, as Perry-Smith and Shalley (2003) aptly propose, there is a point of diminishing returns, “where too many weak ties are no longer advantageous” (p. 95). The latter is especially true when there is no perceived availability of time to cultivate weak ties, as was the case in the Grampians domain. Hence, time is considered another diffusion moderator in the study. However, the study’s concept of time is differentiated from Rogers, who interprets the time variable in terms of the duration of a linear (knowledge, persuasion, decision, implementation, confirmation) innovation process.

In Rogers' diffusion framework, the success of an innovation is measured by time, as defined in the previous paragraph, and critical mass, when the rate of adoption becomes self-sustaining and change is achieved. Rogers does not refer to actors' commitment to the change process, nor to the collective and reflexive learning process that is involved in achieving change. In the study, lack of actor commitment to reciprocal and reflexive learning proved a significant deterrent to domain innovation and change. As McIlduff and Coghlan (2000) have demonstrated, for a system to change, key individuals have to be motivated to change and do something about what needs changing (e.g., make information available to overcome lack of trust and resistance to change). In this study, domain actors did not make use of the consultant as a change agent and were left to their own devices to become their own change agents, many of which did not see the immediate need for change. The prevalent parochial worldview placed actors on the periphery of innovation boundaries. McLeod, Sotirovic, and Holbert (1998) include worldview in a set of sociotropic judgments that exert major influence on normative roles, values, and communication patterns. Worldview and commitment to learning are hence included as contextual moderators in the study's diffusion framework.

In summary, Rogers (1995) defines the main elements of diffusion as the innovation, the communication channels, the social system, and time. While the study recognizes these elements, it also suggests a strong relationship between network structure and diffusion, extending the traditional diffusion framework with contextual moderating components resulting from the network structure. Moderating components include space, place, power, trust, worldview, and commitment. These contextual elements—such as place (status and position in the network), space (the geographic make-up of the network), power, trust, worldview, and commitment—proved to be pivotal moderating components of ICT diffusion. Actors' apathy to transfer, assimilate, coordinate, and utilize information across the domain, limited actor access to the "old boy" network, cultural divergence, and the overall lack of collaborative strategic thinking across horizontal and vertical tiers precluded network innovation and change. The incorporation in the study's diffusion framework of contextual moderators considerably extends

Rogers' traditional diffusion of innovations framework and provides an initial benchmark for tourism network innovation.

Conclusion

This study has identified a number of barriers to ICT diffusion in a regional Australian network. While some of the diffusion issues raised in this study may pertain uniquely to Australia, such as geographical and spatial network issues, parallels may be drawn with existing ICT-related network research, such as actor reluctance in taking up ICT and joining a network (Evans & Peacock, 1999). The latter may be a reflection of the seemingly universal atomistic culture of tourism firms and a predominantly unregulated industry. As Gretzel, Yuan, and Fesenmaier (2000) have pointed out, destination success in the new economy is more about change in approach than about technology itself. To avoid the dominance of economic and technical considerations and the marginalization of human considerations, tourism organizations, communities, and networks seeking to incorporate ICT will need to address persistent cultural and business practices vis-à-vis ICT-related innovation.

The necessity of bridging the large versus small firm digital divide also merits further consideration, as will the need for continued learning support for SMTE of so-called "soft innovation" elements. To get comfortable and take mental, physical, and virtual possession of a shared ICT domain, initial value for small firms lies in the debunking of ICT jargon, cutting connectivity cost, gaining online visibility, gaining trust in new media leadership, and obtaining e-commerce skills through linkages with local networks.

Cooperative marketing and distribution relationships vis-à-vis the Internet would also benefit from further examination. An appropriate balance needs to be struck between autonomy and competition, whereby buy-in schemes and branding will need careful reconsideration in moving from competitive-exclusive to a competitive-inclusive models. By drawing on a broader skill base through the forging of new partnerships between regional e-commerce experts and marketing bodies, issues such as product richness and channel reach may be addressed. Similarly, inclusion of small firms in glo-

bal marketing and distribution systems may help advance tourism regions into the global marketplace and help forge new destination management partnerships.

Tourism networks are dynamic organisms with ever-changing actors and contextual innovation factors. Extending the recognition and benefits of interactive and reflexive network innovation practices to include the actual change processes and capture the learning is essential. When one does not encounter the type of difficulties the researcher experienced in setting up collaborative learning processes, an action research approach to ICT-related innovation can offer excellent opportunities for gaining deeper insights into the complex nature of tourism networks. Using action research can be helpful as an orientation toward network development, as, ideally, the approach pervades every network member, group, and activity. It is obvious that the establishing of an ICT-based network involves an intensive learning process for every actor involved in the network. This requires strong social ties within the network, fluid communications flows, and strong network leadership and commitment to learning and change. To accomplish this, an external change agent may need to be employed to facilitate the learning process. Conversely, if the network is too large to foster an inclusive learning culture, division of the network into smaller learning environment may merit consideration.

Understanding the change processes that take place in tourism networks has the potential to benchmark change, speed up ICT diffusion, and create effective collaborative network outcomes. While this study provides some initial insights into network relationships vis-à-vis ICT diffusion, many questions still remain unanswered. There is much scope for tourism network research in the knowledge economy, especially in view of regional cooperation and learning policy agendas.

Biographical Note

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