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# Challenging the Assumptions of Unconstrained Electronic Trade across the Internet Space

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## Abstract

We examine the prevailing factors influencing the uptake, scope and modality of internet-worked trade amongst Small and Medium Enterprises (SMEs) and the extent to which this effectively re-defines our notions of what constitutes viable and attractive local, regional or global trading zones as viewed by SMEs for the purpose of Electronic Commerce (EC). It is noted that such de-facto re-definitions, for some potential internet transactors, may arise through their preference to operate within the virtual sub-space confined to those zones or modes of electronic trade which are perceived by them as relatively more familiar and secure. The factors responsible for the paradox between this and the modern market metaphors of global village and virtual borderless world are examined in the context of evolving notions of virtual network enterprises or Net-conurbations with the development of intranets and extranets.

Based on triangulation of results from three separate survey instruments, carried out amongst 500 SMEs in the East Midlands region of UK, this study has confirmed earlier findings (Badii 1998) that lack of full E-commerce awareness coupled with limited technical/skill resources, the high set-up costs and the risks of integrated internet deployment, tend to be the primary determinants of the degrees of perceived operational freedom towards full strategic uptake of electronic trade by typical SMEs. Their comfortable Internet trading modes/zone limits were found to be de-limited by the frontiers of contingent physical reachability, native transaction clearing, trust root and jurisdictional systems. A randomly selected 12% subset of the respondents to the first survey (32%) were further investigated and their current growth stage was assessed using a model-based heuristic evaluation function. This analysis supported the earlier findings, again indicating that only a few SMEs were attempting to exploit the Internet for competitive advantage. We conclude that for global internet trade to flourish a hierarchy of pre-requisites have to be realised; notably, a framework of standard componential business logics and objects, internet transaction kernel processes and objects libraries for low cost, chain-specifically reusable and universally inter-operable deployment, inter-intra-extra-organisational, legalistic and inter-governmental precursor systems deemed essential for seamless secure and successful electronic trade.

## Introduction

The "global village" is now facing parallel uncontrolled and chaotic, almost explosive, increases in theoretically available degrees of freedom to exploit the communication and knowledge-based economy. The internet-based virtual marketplace promises the possibility of cash transactions Anywhere, Anytime by Any business selling Any products/services to Anyone (the 5As ideal). However such electronic trading freedoms are constrained, at least for most SMEs, by the actual or perceived higher degrees of freedom for internet fraud and losses arising from current EC development/deployment risks including lack of high level WWW interoperabilities, insecure networks and misplaced trust. It is therefore appropriate to suggest that the above model may remain an unattainable ideal given the currently asymmetrical nature of trust-based transaction clearing systems world-wide. This means that perceived extra risks associated with trading across time zones or even beyond the physical reaches of a "home region" tend to inhibit the much heralded ideal of free electronic trade irrespective of the distance.

Yet success of global Internet trade crucially depends on its full adoption by a critical mass of SMEs which exist in most markets. Thus the promise of sustainable future growth of internet trade should be first tested by focusing on the patterns of internet uptake by SMEs and assessing the degree to which our assumptions on its prospects are challenged due to absence of some fundamental prerequisites; for example lack of transaction environment symmetry in the geo-economical, jurisdictional, socio-technical and cultural spaces, costs, access speed, lack of standard reusable EC components, and, even the divergent consumer shopping lifestyles worldwide.

In any event, to help achieve assuredly sustainable competitive advantage, the new transformed organisation would need systems allowing continuous, fast, inexpensive and flexible re-adaptation of internal processes and connectivities, BPR<->BNR cycles, in response to its evolving external connectivity and alliance patterns- the 6th era of harmonious relationships (Galliers & Sutherland 1991). Thus Relationship Management for Mutual Benefit (RMMB) would require contextually aware computable services such as Boundary Sensitised Information Relationship Management System (BSIRMS) (Badii & Rolfe

1995) and systems for dynamically adaptive transaction response, fulfillment, payment settlement enforcement/closure, auditing, site-hits life-cycle tracking and data intelligence mining -not just site development software (Badii 1998). All this would need to be universally deployable, flexibly accessible, readily re-configurable at affordable entry and running costs.

## Motivation

As physical thresholds of time and space give way to thresholds of electronic connectivity across time zones, the increasing world-wide structural transparency of such electronic commerce chains will allow the idiosyncratic local topology of a given chain to modify the influence of Porter's forces (Porter 1979) thus modifying the relationship entry/exit thresholds, barriers and costs. Such topologically local factors would include the range of available substitutes for any given link in the chain, anywhere, at any time, as well as, the currently dominant relationship exit/entry triggers. For the enterprise strategists to win in the new emerging marketplaces they must be kept familiar with the rapidly changing influences affecting relationship losses/gains, attendant opportunity costs and risks. These observations would tend to cause the notions of virtual enterprise (Castells 1997), Net- conurbation and trade zones to come under review in the cyber-marketplace (Badii 1998). We therefore hypothesised that notwithstanding the hype and hopes associated with internet-worked business SMEs would tend to concentrate on selling locally rather than globally even when the selling was to be done electronically with no physical constraints. Further, the notion of what constituted a cyber-region; ie the *virtual locality* criterion or home region as the bounded area of physical/virtual SME-preferred trade was affected by a mix of influences eg technology limitations, personal, cultural and socio-geo-econo-political.

## The Research Process

Accordingly our empirical research used a survey instrument on a stratified random sample of 500 SMEs in the Midlands region of England, as well as, field studies carried out by some local Department of Trade (DTI) Information Society Initiative Centres amongst their SME clients seeking assistance with EC applications development. The sample included SMEs from most economic sectors including manufacturing, transport, services, and retail sectors. Our preliminary analysis of the focus of research factors led to the design of a questionnaire comprising four sections each devoted to eliciting mainly qualitative responses on key attributes and relationships between the systems and transactors influencing the internet trading processes. Thus the instrument sought to focus the data acquisition on **a)** general problem areas **b)** reliability speed and security problems, **c)** control and legislation problems, **d)** access and software problems. The survey achieved a 32% full response set; the greater proportion of this (some 63%) was from the

services sector with 27% from manufacturing and others.

## Results

The instrument resulted in articulation of SME views on many aspects of internet as a business tool; its uses, drawbacks and the particular areas deemed badly in need of improvement before internet-worked trade could become more practical for more businesses and their customers and thus find wider accessibility and appeal as a potential electronic trade medium. A pattern of responses emerged which confirmed our earlier findings (Badii 1998). In particular, chief amongst the factors of concern to SMEs were found to be lack of internet know-how, set-up cost for full internet EC functionality deployment, lack of standard reusable components for flexible accessibility and reachability, security, seamless integration with internal process chain, benefits measurability, transaction life-cycle tracking and intelligence processing support.

By analogy with the analysis of the EDI growth models (eg Lummus & Duclos 1995) the following seven stage model of Internet trade deployment was devised:

1. earliest exploratory stage with limited business use
2. using a limited set of functions primarily e-mail leaving existing functions intact
3. increasing use of e-mail plus small scale deployment of other functions eg operating own Web site
4. requiring own Web site, with some business units deploying Internet functions extensively but for limited impact activities
5. Extensive Internet trading alliances with wide ranging deployment of Internet functions; on-line trading but financial transaction closure still by other methods.
6. Internet functions becoming business-critical for some applications; internet becoming a significant part of business strategy with integration across business processes and financial transactions taking place fully but with a limited set of partners
7. full Internet functionality deployment integrated throughout the organisation; Internet being crucial to business strategies with all business units maintaining on-line financial transactions with suppliers and customers

A model-based heuristic growth stage evaluation function was evolved giving a notional growth stage of six for a fully integrated transformed organisation.. This stage model strongly correlated with the number of employees, which was found to be a reliable indicator of the scope of internet-worked trade potentially practised by the company. Conversely the number of employees did not correlate with other operational factors for example the annual turnover. Cyber-regions, which transcended regulatory boundaries or extended beyond geo-political market zones, were not viewed as normal free trading regions by SMEs. This may be explained by the fact that regions were expected, at least by

this class of users, to have visible, known and communicable jurisdiction, rules etc but cybers do not as yet. SMEs generally were found to use Internet for e-mail, competitor information and EDI. If they operated Internet trade, then this was confined to self-imposed levels and regions determined by boundaries which allowed transactors to be ultimately reachable by identical, symmetrical or at least known and trusted jurisdictions. This was also consistent with the fact that their business-to-business trade was dominantly local which allowed them more efficient supply chain management; and, critical mass of electronic shoppers was still awaited; perhaps pending the mass adoption of digital TV.

## Conclusion

Thus in this emerging pandemonium model of diverse and unstable virtual value chain topologies, we would expect SMEs to continue to find more security in electronic trading and inter-organisational bonding within virtual zones which map onto their own zones of shared and thus familiar and trusted information systems, trust-based chains of credit and transaction control as well as jurisdictional and even cultural symmetry. SMEs will still benefit by using the Internet to keep up-to-date with global standards, which they can compete with in their own virtual trade locality. This is essentially mirroring the

larger enterprises and multi-nationals mindset migration from local to global trade as has long taken place; with businesses having a world-wide SBU structuring offering locally-tailored products to suit each local market (Kanter 1995).

Thus the carefree pursuit of boundariless trade still has to await the establishment of more efficiently accessible, reliable and secure Internet technology. For example, less expensive and easier access modes, wider presence of other businesses on the internet, mapping of the internet using better navigation systems with more user friendly epistemic model of the internet search space at appropriate abstraction layers, greater choice of access paths, availability of best practice advice on internet trade, enhanced systems speed and reliability, enhanced firewall, transaction and legal enforcement systems; improved e-mail and encryption software, international regulatory frameworks establishing standards on all operational aspects of electronic transactions, clearing and payment methods as well as on copyright enforcement, bankcard authentication systems and electronic cash methods with wider uptake and guaranteed non-repudiation, more enforceable and higher service level standards from internet providers.

References available upon request from the author.

$$[\text{interger}((\text{no.users}/25 * \text{no.employees}/50) + (\text{no.usage.areas}/6) + (\text{new.transaction.capabilities}/6) + (\text{new.functions}/5) + \text{strategic.use}/2.5) + 0.33)]$$
 was used to assess the respective Internet adoption growth stages for a random sub-set of some 12% of respondents; ie for 15 SMEs as follows:

**Table 1:** Evaluation of Stages of Growth in SME Internet Adoption

SME	No. of Users	Users as % of Employees	No of Business Areas	No of New Capacities	No of Functions	Extent of Proclaimed Strategic Usage (1-5)	Internet Adoption Growth Stage
1.	1	10.00%	2	1	2	1	1
2.	4	0.80%	1	1	3	2	2
3.	2	40.00%	2	1	2	0	1
4.	4	2.00%	3	2	4	3	3
5.	3	38.00%	4	2	2	3	2
6.	5	1.66%	1	3	4	2	2
7.	7	78.00%	2	2	3	4	3
8.	1	0.20%	0	0	0	1	0
9.	6	12.00%	3	2	1	2	2
10.	4	7.50%	4	1	3	3	3
11.	3	0.65%	1	3	2	1	2
12.	16	9.10%	5	3	4	2	3
13.	7	14.00%	4	4	6	3	4
14.	3	48.3%	2	1	3	3	2
15.	21	5.00%	1	2	4	2	2

It can be seen that only one SME was found to be deploying the Internet on a significant scale with an Internet adoption growth stage of 4; a majority of the SMEs, then, being at stage 2.