Factors Affecting The Uptake of E-business by Small Building Enterprises

Guillermo Aranda-Mena, Nick Blismas and Ron Wakefield
Initiative:
To accelerate the uptake of e-business by Small Building

Project Sponsors:

Newcastle University
school of property construction and project management
E-business definition

• The undertaking of business related transactions and information exchanges utilising and electronic format and environment (e-MORI 2001).

• The creation of networks that act as electronic supply chain (NOEI 2001)

• The creation of commercial efficiency with subsequent benefits for all stakeholders (Ribeiro 2001).
### E-business process [NOIE 2003]

<table>
<thead>
<tr>
<th>Process</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>e-procurement</td>
<td>Procuring direct or indirect projects, parts, components, materials, plant services, experts and manpower, as well as handing added services. Disseminating and gathering information about projects, components, services or plant.</td>
</tr>
<tr>
<td>e-transactions</td>
<td>Transactions across the space between the buyer and seller in the supply chain involving, projects, parts, components, materials or plant.</td>
</tr>
<tr>
<td>e-logistics</td>
<td>Delivering parts, components, materials, plant, information, energy to the point where they are needed</td>
</tr>
<tr>
<td>e-collaboration</td>
<td>Facilitates coordination of various decisions and activities beyond transactions among supply chain partners. Collaboration among teams in a virtual space such as collaborative design, planning and project management. Information across business partners such as order, invoices or plans and specifications.</td>
</tr>
</tbody>
</table>
## Adoption rates [NOIE 2003]

<table>
<thead>
<tr>
<th>Activity</th>
<th>All</th>
<th>Manufacturing</th>
<th>Building &amp; Construction</th>
<th>Retail</th>
<th>Wholesale</th>
<th>Storage</th>
<th>Transport</th>
<th>Services</th>
<th>Business</th>
<th>Personal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use Computers</td>
<td>85%</td>
<td>81%</td>
<td>77%</td>
<td>81%</td>
<td>85%</td>
<td>94%</td>
<td>85%</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Internet connected</td>
<td>61%</td>
<td>59%</td>
<td>50%</td>
<td>51%</td>
<td>60%</td>
<td>81%</td>
<td>59%</td>
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</tr>
<tr>
<td>Place orders using the Internet</td>
<td>17%</td>
<td>14%</td>
<td>7%</td>
<td>17%</td>
<td>17%</td>
<td>22%</td>
<td>20%</td>
<td></td>
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</tr>
<tr>
<td>Make payment on the Internet</td>
<td>12%</td>
<td>11%</td>
<td>6%</td>
<td>11%</td>
<td>10%</td>
<td>15%</td>
<td>12%</td>
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<td></td>
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</tr>
<tr>
<td>Receive orders using the Internet</td>
<td>15%</td>
<td>14%</td>
<td>6%</td>
<td>15%</td>
<td>25%</td>
<td>15%</td>
<td>20%</td>
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</tr>
<tr>
<td>Receive payment using the Internet</td>
<td>7%</td>
<td>8%</td>
<td>2%</td>
<td>7%</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
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</tbody>
</table>
Environmental Constrains / Barriers
[as by literature review]

These relate to impediments resulting from the nature of
• industrial culture,
• economic structure,
• societal relationships and
• organisational profiles.

These have a direct impact on
• Technology adoption profile
• Procurement process
• Nature of its supply chain and industrial organisation
• Skills and organisational development –
• Audits of technology and maturity levels for the uptake of e-business
E-business environment
Barriers to E-Business Adoption: International Review [COBRA – Brisbane 2005]

- Confidence / Trust
- IT skills training / literacy
- Cultural change
- Business process change
- Initial financial cost
- Privacy issues
- Goods unsuitable for e-sale
- Service unsuitable for e-sale
- Lose of current clients
- Uncertainty of financial returns
- Lack of reliable measurement
- Need for face to face communication
- Management commitment
- Maintenance running costs
- Connection speed
- Technological updates
- Gov. support and information
- Quality of current infrastructure
- Reliability of current infrastructure
- User authentication / fraud
- Not sure of benefit
- Dissatisfied with performance
Barriers to E-Business Adoption: International Review [COBRA – Brisbane 2005]

1. Awareness
2. Confidence / trust
3. Cultural change
4. IT skills training / literacy
5. Business process change
6. Initial financial cost
7. Privacy issues
8. Goods unsuitable for e-sale
9. Service unsuitable for e-sale
10. Loss of current clients
11. Uncertainty of financial returns
12. Lack of reliable measurement
13. Need for face to face communication
14. Management commitment
15. Maintenance running costs
16. Connection speed
17. Technological updates
18. Gov. support and information
19. Quality of current infrastructure
20. Reliability of current infrastructure
21. User authentication / fraud
22. Not sure of benefit
23. Dissatisfied with performance
Study design and ethics approval

HRESA

HF HP
Building 5C0.2.36
Bundoora West Campus
HRESA: 6TA 10:00 (1)

Wednesday, 8 June 2005
Dr Guillermo Aranda – Mena
CR School of Property, Construction and Project Management

Dear Guillermo

Re: Human Research Ethics Application Approval

The Design and Social Context Human Research Ethics Sub-Committee received your amended ethics application entitled: "E-business adoption in construction (CRC Construction Innovation)."

I am pleased to advise that the Chair has now approved your application as level 2-risk classification.

This now completes the Ethics procedures.

You are reminded that you are required to complete an Annual/Final report, which should be forwarded to the Secretary of the DSC HRESA – B at the above address not more than 12 months from date of this letter.

Should you have any queries regarding your ethics application please seek advice from the Chair of the sub-committee Assoc. Prof. Heather Feuring on 9925 7640, heather.feuring@rmit.edu.au or contact me on (03) 9925 7677 or email heather.porter@rmit.edu.au.

I wish you well in your research.

Yours sincerely

Heather Porter
Secretary
Design and Social Context
Human Research Ethics Sub-Committee
Operational Unit - Bundoora
4. (only adopters) Does your business have a dedicated web site? Yes/No

If yes, how long has your business had this facility? (approx. years / months)

How often do you update the website?

Do you do the updates or does your service provider?

If less than 1 year:
Why have you not had a business website in the past? (e.g. prior implementing as at present) Tick relevant response.

- because there was no need to
- because I did not know where to get it
- because I could not afford the initial cost
- because of the maintenance costs
- because of learning costs
- because I feared the legal issues / implications (e.g. business privacy)
- because I feared issues of security (e.g. losing documents)
- because of lack of advice and support by professional bodies
- because of lack of advice and support by Government
- because I think it makes my staff waist time (e.g. e-mail and web browsing)
- other (briefly describe)

Discuss (i.e. I did not have a business web site in the past because?)

5. (only adopters) How important do you think it is to have a business web site? (e.g. develop web presence)

- very important (e.g. nowadays it is expected in order to remain in business)
- important (e.g. it creates new business opportunities)
- not so important (e.g. just another way to advertise)

Discuss (i.e. What a dedicated web site has done for your business?)
Respondents

Regional non-adopter [RN] (n=5)
Regional [R] (n=5)
Metropolitan non-adopter [MN] (n=5)
Metropolitan [M] (n=5)
Q: Do businesses like yours need assistance to set a web site?
A: The type of support that our business like need when setting up and maintaining a business web site includes the “easy updating and maintaining”. We would like to know how to upload new images to our site instead of paying someone else to do it. I think the Government should be able to assist in the set-up costs and we should be able to apply for funding grants. The MBAV should play a role in supporting businesses like ours to set up and maintain a web site. We also should receive a discount if we use a recommended web designer and service provider from the
### What would make you have a web site?

<table>
<thead>
<tr>
<th>Factor</th>
<th>RN1</th>
<th>RN2</th>
<th>RN3</th>
<th>RN4</th>
<th>RN5</th>
<th>MN1</th>
<th>MN2</th>
<th>MN3</th>
<th>MN4</th>
<th>MN5</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promote business (on-line presence)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
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<td>1</td>
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<tr>
<td>Improve business service - ie contact us enquiry form</td>
<td>3</td>
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<tr>
<td>Ability to upload documents</td>
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<tr>
<td>Number of e-mail addresses supplied with my site</td>
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<td>Have a business name as domain</td>
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<td>To take credit payment</td>
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### Who influenced you to use the web?

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<tr>
<th>Influencer</th>
<th>RN1</th>
<th>RN2</th>
<th>RN3</th>
<th>RN4</th>
<th>RN5</th>
<th>MN1</th>
<th>MN2</th>
<th>MN3</th>
<th>MN4</th>
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<td>Wife / partner</td>
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<td>Junior employee</td>
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<td>Secretary</td>
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<td>Son's wife</td>
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<tr>
<td>Grandchildren</td>
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<tr>
<td>Informed through trade body</td>
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<td>Informed by general media</td>
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<tr>
<td>Common sense</td>
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<tr>
<td>University</td>
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<tr>
<td>Client</td>
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<tr>
<td>Sales person</td>
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<td>Need for on-line yellow pages</td>
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</table>

### What do you most use the Web for?

<table>
<thead>
<tr>
<th>Activity</th>
<th>RN1</th>
<th>RN2</th>
<th>RN3</th>
<th>RN4</th>
<th>RN5</th>
<th>MN1</th>
<th>MN2</th>
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<th>MN4</th>
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<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
</tr>
</thead>
<tbody>
<tr>
<td>To pay bills</td>
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</tr>
<tr>
<td>To find clients</td>
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<tr>
<td>To find suppliers</td>
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<td>To obtain quotations / specs</td>
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### Private use of Internet

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<th>Frequency</th>
<th>RN1</th>
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<th>RN4</th>
<th>RN5</th>
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<th>MN3</th>
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<td>20 minutes a day</td>
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<td>1 hour a day</td>
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<td>More than 1 hour a day</td>
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</table>

"I can not remember what made me start using the Internet. I'm one of two directors, we both are the drivers and the users for technology." [MN1]

"My wife uses the internet a lot for her work at the yacht club. They send out brochures and information via e-mail because it is cheap." [MN3]
<table>
<thead>
<tr>
<th>Importance of e-mail to business</th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
<th>R4</th>
<th>R5</th>
<th>MN1</th>
<th>MN2</th>
<th>MN3</th>
<th>MN4</th>
<th>MN5</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
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<tr>
<td>one to one messaging</td>
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<tr>
<td>group messaging</td>
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<td>2</td>
<td>3</td>
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<tr>
<td>make appointments</td>
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<td>document exchange</td>
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<td>to replace the fax</td>
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<thead>
<tr>
<th>Do you use e-mail?</th>
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<tr>
<td>yes</td>
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<tr>
<th>Why don't you get a business web site?</th>
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<tbody>
<tr>
<td>Because there is no need to</td>
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<td>Because I did not know where to get it</td>
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<td>Because I could not afford the initial cost</td>
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<td>Because of maintenance cost</td>
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<td>Because of learning costs</td>
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<td>Because I feared legal issues</td>
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<td>Because I feared issues of security</td>
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<td>Lack of advice and support by professional bodies</td>
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<td>Lack of advice and support by Government</td>
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<td>Because I think it makes my staff waste time</td>
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<td>Because I did not have the time</td>
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<td>Because equipment was expensive and no tax incentives</td>
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<table>
<thead>
<tr>
<th>How important do you think it is to have a business web site?</th>
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<tbody>
<tr>
<td>Very Important; In order to remain in business</td>
<td>1</td>
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<tr>
<td>Important; It creates new business opportunities</td>
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<tr>
<td>Not so Important; just another way to advertise</td>
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</table>

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"I hardly use the internet and would have a business dedicated web site if I'm under threat of losing my building license." [MN2]

"I like my business in its current size and I don't need any more customers. I use the e-mail less than 20 minutes per week." [MN2]

"I would imagine the ____ is already giving assistance. I'm sure they would help if I rang." [MN3]

---

**CRC Construction Innovation**

**BUILDING OUR FUTURE**
### What would you have a website for?

<table>
<thead>
<tr>
<th>Function</th>
<th>RN1</th>
<th>RN2</th>
<th>RN3</th>
<th>RN4</th>
<th>RN5</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promote my business (online presence)</td>
<td>1</td>
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<tr>
<td>Improve business service - ie contact us enquiry form</td>
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<tr>
<td>Product catalogue</td>
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<tr>
<td>Ability to upload documents</td>
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<tr>
<td>Number of e-mail addresses supplied by my site</td>
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<td>Have a business name as domain</td>
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<td>To take credit payment</td>
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</table>

### Who influenced you to use the web?

<table>
<thead>
<tr>
<th>Influencer</th>
<th>RN1</th>
<th>RN2</th>
<th>RN3</th>
<th>RN4</th>
<th>RN5</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peer influence</td>
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</tbody>
</table>

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"I also use the internet for banking personal e-mailing, research, and computer games."

For this respondent, his business depends on e-mail. Three main key benefits include: 1. Instant communication 2. 

"Approximately one year of having a dedicated web site. Our site is updated by our service providers after each project."

Q: Do businesses like yours need assistance to set a web site? A: The type of support that our business like need: 

A web site is another way to advertise, we refer to it in our marketing material. From our experience the main benefit: 

"We now just search using the internet because of the speed for retrieving data, it is helpful for investigating new products.

Q: Why have you not had a business web site in the past? A: Because I did not know where to get it. New staff members.

"My role is that of an architectural assistant and main driver for technology. Everyone in the business is the user of technology.

We also use the Internet for banking and bill paying. Background information: Bookkeeper / admin support. I normally..."
Summary of Comments on E-business.htm

Page: 1

Author: GMT
Subject: Underline
Date: 24/05/2005 7:23:24 AM
The type of support that a business like this needs in terms of web design, getting the right design, getting the right message
underneath is important. Many businesses haven't thought through in how to get the right climate. Then you go and set up
It. You haven't thought of Government supporting it, in terms of governmental assistance. F1 say that we need to have free security
for everyone. [GMT]

Professional businesses should provide information on what's current, which is using it more guidance of next practice. My type of
business would need to have support but can be self-developed as we do. [GMT]

Professional associations might be able to assist more, especially for the decisions at business level. Promote it for those less
technical limited. Service providers should give us more support in this. [GMT]

We didn't really need much support. Saying that, the NSAU might be useful for the smaller operators especially those who don't
know where to go? [GMT]

Author: GMT
Subject: Underline
Date: 23/05/2005 15:17:24 PM
2. Clearer than yellow pages
3. Current than yellow pages
4. Searchable than yellow pages, or what is available in, coloured schemes rather than just vision displays names.
5. Clearer business opportunities [GMT]

"We need a dedicated business web site for over 4 years. It gives me a presence and is a good advertising channel. I assist our
communication with our clients and we can find supply information for our clients. [GMT]

The benefits of the Internet include:
1. Marketing tool
2. Product information
3. Advertisement

Comments from page 1 continued on next page

Author: GMT
Subject: Underline
Date: 24/05/2005 6:45:31 AM
Households having a dedicated web site is very important. Perhaps greater than no 1 on your scores, we get heaps of requires
over the Internet. [GMT]

Author: GMT
Subject: Underline
Date: 24/05/2005 7:10:03 AM
"For us to have the Internet and would have a business dedicated web site I'm under threat of losing my building license. [GMT]

I would imagine the In 3 already giving assistance. I'm sure they would help me. [GMT]

Author: GMT
Subject: Underline
Date: 23/05/2005 5:36:31 AM
"Whether we have the Internet is very important. Perhaps greater than no 1 on your scores, we get heaps of requires
over the Internet. [GMT]

Households having a dedicated website is very important. Perhaps greater than no 1 on your scores, we get heaps of requires
over the Internet. [GMT]

Government should be able to assist in the setup cost and we should be able to apply for funding grants. The NSAU should pay

Comments from page 1 continued on next page
Attitude results between metropolitan non-adopters and rural non-adopters (MN and RN) were similar. The only difference is that metropolitan non-adopters have shown a common non-interest in using the Internet. Conversely, the rural non-adopter group (RN) tended to use the Internet (including the web and e-mail) for private purposes and results indicate that they are familiar and more confident ICT users. Results show that they will be e-business adopters in the near future.

Having the right attitude of ‘let's give it a go’ is perhaps the single most important aspect towards SMEs e-business adoption – where someone driving the uptake of e-business is not necessarily a user of the technology. This is illustrated in the following,

“I am a junior consultant for this business, I am the main user of technology. Greg is the owner, he spends money but doesn’t really use it although he is looking on ways improve our business” [R3]

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Groups</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M2, M3</td>
<td>These have strong ICT values including, formal training, high use of e-mail and high use of web searching</td>
</tr>
<tr>
<td>2</td>
<td>R1, R2, R3, R5, M1, M4 &amp; M5</td>
<td>Similar values to cluster 1, however, the main difference with this group is that they have no formal ICT training and have learned in their own spare time – mainly through a partner or family member. This group has identified the lack of time as the mayor barrier to learn.</td>
</tr>
<tr>
<td>3</td>
<td>MN1, MN2, MN3, MN4, MN5</td>
<td>The metropolitan non-adopter group has shown the highest level of scepticism. This group has an attitude of ‘there is no need for Internet to run a small business’. Indicating the most challenging group to push towards adoption.</td>
</tr>
<tr>
<td>4</td>
<td>RN1, RN2, RN3, RN4, RN5</td>
<td>Attitude results between metropolitan non-adopters and rural non-adopters (MN and RN) were similar. The only difference is that metropolitan non-adopters have shown a common non-interest in using the Internet. Conversely, the rural non-adopter group (RN) tended to use the Internet (including the web and e-mail) for private purposes and results indicate that they are familiar and more confident ICT users. Results show that they will be e-business adopters in the near future. Having the right attitude of ‘let’s give it a go’ is perhaps the single most important aspect towards SMEs e-business adoption – where someone driving the uptake of e-business is not necessarily a user of the technology. This is illustrated in the following, “I am a junior consultant for this business, I am the main user of technology. Greg is the owner, he spends money but doesn’t really use it although he is looking on ways improve our business” [R3]</td>
</tr>
</tbody>
</table>
Industry Information Booklet

- Providing insights into the current nature and use of electronic supply within the Australian Construction Industry [SMEs].
- Aims to inform raise awareness and demonstrate the key issues, concerns and advantages when conducting e-business
- It has a wider perspective on adopting new technologies
- 20-40 pages in length
- Will be sent to 15,000 builders through the Building Commission of Victoria
Contents

1. E-business in construction 3
2. E-business Technologies 4
3. What are you? 7
4. E-business myths 8
5. Benefits 13
6. Large construction websites 14
7. What are your business processes? 16
8. How will e-business support your business processes? 18
9. Getting started 22
10. Legal and Security Issues 24
11. Frequently asked questions 25
12. Do you want to know more? 29

Q: Is e-business for me?
A: If you want to stay in today’s competitive construction market and create new opportunities for your business and increased value for your clients then you should be considering e-business. You should check out the company case studies of companies who are embracing e-business and who are referenced in Section 12. Do you want to know more?

Q: What are the real benefits for a small business like mine?
A: You can increase your business opportunities and create profit and growth in a simple way. E-business applications will help you strengthen your relationships with other businesses and clients. They can reduce risk to your present and help you to reduce the cost of doing business. In most cases the electronic files will help you with establishing and processing claims for work and identifying exactly what dressing or specification has changed during the construction period.

Q: Is e-business safe?
A: E-business really isn’t any riskier than traditional ways of doing business. By doing your business electronically all your transactions should be recorded and saved. In Australia, legislation has already been enacted to give electronic communications and digital files the same status as written communications and files at law, which is known as the Electronic Transactions Act. The Act facilitates e-business in Australia by removing existing legal impediments that may prevent businesses using e-business applications to satisfy legal obligations under the Commonwealth Law. If you use the web based e-business services then the transactions can be secure and service providers automatically secure and backup the project data for you. Details can be found on:

commerce-Electronic_Transactions_Act_Advice_for_Commonwealth_Degments
Steps to deliver value to SMEs through e-business

- **Identify** whether a business is an innovator, early adopter or a follower. Businesses in the first two categories are rare, and those in the last group tend to reduce the perceived level of risk by adopting only proven or mainstream processes.

- **Review** how customer needs are changing and what operational benefits can be achieved by new business process designs.

- **List** all of major business processes, and rank them in order of importance to your customers, business and contribution to the bottom line. In doing this identify which of the existing business processes require collaboration and information exchange. For these you will have to consider common information exchange formats and how collaboration will be maintained.

- **Review** the e-business case studies and best practice examples when deciding on which processes will be re-designed.

- **Scan** emerging technologies, as they affect customer needs and customer needs then influence business designs. Eventually these business designs will affect processes which in turn will influence the next generation of technologies.

- **Examine** the applications existing service providers offer, and the range of existing generic applications, then measure their fit with your specific needs. You probably should do this with your working associates so that collaboration on projects can be improved.

- **Develop** your e-business plan and justification. Ensure that it has a focus on the customer, that it seeks creation of value, it transforms business processes into digital form, and it has a forward looking application architecture (to enable integration with other systems while reducing costs and increasing customer satisfaction).

- **Examine** your internal skills and abilities to deliver the e-business plan and aim to acquire any skills that cannot be readily found within your business. Of course senior management support and involvement and adequate training of staff are also going to be essential for success of your activities. So make allowances for this within the plan.

- **Ensure** that you have a narrow focus for each e-business design, and that there is an overall strategy in place to move from task orientated to functional then to integrated systems.
Getting started

So how do we get started and how do we ensure that e-business will deliver value to our daily operations?

We suggest you consider following these steps:

Step 1: Firstly identify whether your business is an innovator or a follower. Businesses in the first two categories are rare, and those in the last group tend to reduce the perceived level of risk by adopting off-the-shelf or mainstream processes.

Step 2: Review how customer needs are changing and what operational benefits can be achieved by new business process designs.

Step 3: List all of your major business processes, rank them in order of importance to your customers and business and by their contribution to the bottom line.

Step 4: In doing this identify which of the existing business processes require collaboration and information exchange. For these you will have to consider common information exchange formats and how collaboration will be maintained.

Step 5: Review the e-business case studies and best practice examples when deciding on which processes will be re-designed.

Throughout this section we have covered the need to analyse and plan thoroughly for the successful introduction of e-business applications for your business process. As we explained previously, start to re-design a number of processes that will provide the most value to customer and benefits for your business.

If you wish to achieve competitive advantage then you need to be an early adopter, because once the value of these applications has been demonstrated a number of your competitors are likely to quickly adopt the same applications, and despite any competitive advantage you had acquired, if your business has limited resources or lacks the minimum resource levels and skills then you may find your costs of production and your business along the path of gaining knowledge and experience in using e-business applications.

Step 6: Scan the emerging technologies, as they affect customer needs and customer needs that influence business designs. Eventually these designs will affect processes which in turn will influence the next generation of technologies costs and increasing customer satisfaction.

Step 7: Examine the applications existing service providers offer, and the range of existing generic applications, and measure their fit with your specific needs. You probably should do this within your cluster of working associates so that collaboration on projects can be improved.

Step 8: Develop your e-business plan and justification. Ensure that it has a focus on the customers, that it seeks creation of value, it transforms business processes into digital form, and it has a forward-looking applications architecture to enable integration with other systems while reducing.

Step 9: Examine your internal skills and abilities to deliver the e-business plan and aim to acquire any skills that cannot be readily found within your business. Of course senior management support and involvement and adequate training of staff are also going to be essential for success of your activities. So make allowances for time within the plan.

Step 10: Finally while making certain that you have a narrow focus for each e-business design, ensure that there is an overall strategic plan in place to move from risk oriented to functional then to integrated cross-functional applications.
THANK YOU