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A Case-Based Assessment of the Descriptiveness of Three CIO Typologies and Validity of Two CIO-Effectiveness Models

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A Case-Based Assessment of the Descriptiveness of Three CIO Typologies and Validity of Two CIO-Effectiveness Models

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Abstract

This paper uses a case study of a single firm to assess the completeness of three CIO typologies, and the validity of two models of factors affecting CIO effectiveness. With respect to the typologies, our conclusions are that all three typologies were also useful for understanding the role of the CIO at PaperlinX. However, Broadbent and Kitzis' (2005) binary trusted senior executive leader versus chief technology mechanic classification appears too coarse-grained, with Leider and Mackay's (2005) typology being more descriptive of the CIO role at PaperlinX. With respect to the two models of CIO effectiveness, our conclusions are that all factors in both models were applicable and important in the case study. The one suggestion we have here is that the Broadbent and Kitzis claim that their model is only applicable for trusted senior executive leader may be too restrictive; it appears to have broader applicability.

Keywords

Chief information officer, CIO, IT management, executive leadership.

INTRODUCTION

The role of the chief information officer (CIO) continues to fascinate the IT industry (CSC 1996, Alter 2005, Holmes 2006, InformationWeek 2007, Center for CIO Leadership 2007, Soat 2007, IBM 2008), but there has been surprisingly little academic research on this topic. Setting aside the many publications on IT alignment, e.g., Luftman and McLean (2004), and the role of the IT function, e.g., Feeny and Willcocks (1998) and Peppard (2007), the most important articles since 1995 on the role of the CIO seem to be Earl and Feeny (1995), Armstrong and Sambamurthy (1999), Ross and Feeny (2000), Broadbent and Kitzis (2005), Kaarst-Brown (2005), Smaltz, Sambamurthy and Agarwal (2006), and Leidner and Mackay (2007).

After reviewing the above articles, in this paper we have adopted Broadbent and Kitzis' (2005) definition of the term *chief information officer (CIO)* as "the most senior executive responsible for identifying information and technology needs and then delivering services to meet those needs" (p.6), and accepted Ross and Feeny's (2000) argument that the role of the CIO has evolved considerably over the past 20 years, and continues to evolve. Further, we have identified two emerging themes in the literature. The first is the notion of a taxonomy of CIO types: Broadbent and Kitzis (2005), Kaarst-Brown (2005), and Leidner and MacKay (2007) all advance arguments suggesting that the role of the CIO is different in different contexts. The second is that various models or explanations of why some CIOs are more effective than others have been advanced in the literature: Broadbent and Kitzis (2005) and Smaltz et al. (2006) both offer models of CIO effectiveness.

Our goal in this paper is to conduct a “reality check” on the claims in these various articles by using data from a detailed case study of a single global organization, PaperlinX Ltd (headquartered in Australia), to assess the completeness of the various CIO typologies, and the validity of both CIO-effectiveness models outlined in more detail in the next section. Thus the two research questions we address using a single case study in this paper are:

1. *How well do the Broadbent and Kitzis (2005), Kaarst-Brown (2005) and Leidner and Mackay (2007) CIO typologies describe the role of the CIO of PaperlinX?*
2. *Which aspects of the Broadbent and Kitzis (2005) and Smaltz et al. (2006) CIO-effectiveness models are particularly apt, and which parts are less so, in the PaperlinX case?*

CIO TYPOLOGIES AND MODELS OF CIO EFFECTIVENESS

The three clearest CIO typologies we have identified in the literature are those of Broadbent and Kitzis (2005), Kaarst-Brown (2005) and Leidner and Mackay (2007). First, based on insights gained at Gartner¹ from “hundreds of executives who have worked with us over many years” (p.ix), six years of monthly reports written for over 2,000 CIOs worldwide for members of the Gartner Executive Program (Gartner EXP), and a 2004 Gartner survey of 950 CIOs, Broadbent and Kitzis (2005) offer both a typology and advice on how to become an effective CIO. Typology-wise they explain that CIO roles vary enormously, depending on whether:

1. the CIO plays the role of a *trusted senior executive leader* (p.13) or a *chief technology mechanic* (p.2) whose job involves just “keeping the lights on” and doing it cheaply (p.13).
2. the CIO’s organization is (a) fighting for survival, (b) maintaining competitiveness, or (c) breaking away (p.15)
3. in a multi-divisional organization, the CIO is a corporate CIO, whose job is to identify and leverage potential synergies across the enterprise, or a regional/divisional CIO whose goals are more narrowly focused on supporting their own parts of the business (p.18).

Second, Kaarst-Brown (2005) suggests that the CIO’s role changes depending on the organization’s dominant assumptions about the role of IT: “necessary evil”, “IT is support, not partner”, “IT rules!”, “Business can do IT better”, and “Equal Partners”. Third, Leidner and Mackay (2007) discuss roles assumed in their first year by CIOs replacing predecessors who had adopted one of three main roles: “keep it running”, “value adding”, or “big bang” roles. Whilst not contradictory, these three typologies clearly focus on different aspects of the CIO role. In the analysis section below, we assess the descriptive power of these typologies by examining the CIO role at PaperlinX through all three lenses.

Turning now to the models of CIO effectiveness, the two clearest models of CIO effectiveness we’ve found are from Broadbent and Kitzis (2005) and Smaltz et al. (2006). First, Broadbent and Kitzis (2005) argue that the most effective CIOs are those who play the “trusted executive leader role”. They further argue that trusted-executive CIOs exhibit the following three characteristics:

1. They are leaders, not just managers. IT leadership, Broadbent and Kitzis (2005) say, is critical. Being a CIO “is about change and influencing others to change” (p.22). It means (a) having a “clear and compelling point of view” or vision about how IT should be used in their organization (p.23), (b) being able to communicate that vision effectively, particularly to members of the executive team (p.24), and (c) building strong relationships with executive colleagues (p.25).
2. They “usually have no formal organizational power” over their executive peers. Instead, they must rely on persuasion, relationships, and influence as they “lead from the back” (pp.28-30).
3. Their capacity to influence their peers depends primarily on their own personal credibility (p.20). Thus a CIO’s success depends not on his/her technical knowledge, nor his/her capacity to deliver projects on time and under budget—though both are important—but rather, on the CIO’s demonstrated success in managing various IT initiatives that deliver benefits to the organization. Under this model, a CIO’s success grows as credibility grows, and credibility grows as IT initiatives deliver business benefits (pp.20-22).

¹ Gartner claims to be “the world’s leading information technology research and advisory company”.
http://www.gartner.com/it/about_gartner.jsp.

Second, Smaltz et al. (2006) propose and test a model of antecedents of CIO-role effectiveness in 100 healthcare organizations. Their findings are that CIO role effectiveness—at least in the healthcare industry where they tested their model—is driven primarily by four factors:

1. the CIO's effectiveness in contributing to the formulation of business strategy (path coefficient 0.30),
2. the CIO's effectiveness in managing relationships with IT suppliers (path coefficient 0.43),
3. the CIO's effectiveness in integrating IT-based systems within the organization (path coefficient 0.32)
4. the CIO's personal capabilities, including (a) effectiveness in building trusting relationships with the business, (b) political savvy, (c) strategic IT knowledge, (d) strategic business knowledge, and (e) interpersonal communication skill. (The path coefficient for personal capabilities was the strongest, at 0.69.)

Comparing these two models, Smaltz et al.'s points 1 and 4 are similar to Broadbent and Kitzis' three points, though with less emphasis on leadership, but Smaltz et al.'s points 2 and 3 are not present in the Broadbent and Kitzis model. In the analysis section below, we explore whether the factors in both models explain the CIO's effectiveness at PaperlinX.

METHODOLOGY

This study is part of a larger project that seeks to understand how IT functions in large organizations should be structured and managed in the second decade of the twenty-first century (2010-2019). The material presented below is based on six hours of interviews with three senior managers, access to public information such as annual reports, news releases, presentations to annual general meetings and stock-market analysts, and newspaper reports. Interviews were audio recorded, transcribed, and compared to the other sources for accuracy. Finally, the following case study was reviewed for accuracy and balance by both the current and past CIO.

PAPERLINX CASE STUDY

According to its 2007 Concise Annual Report, PaperlinX Ltd is a "leading international fine paper merchant and Australia's principal manufacturer of high-quality communication, packaging and industrial papers" (PaperlinX 2007). Since its "de merger" from Amcor Ltd in April 2000, it has transitioned from being primarily an A\$1.5 billion Australian manufacturer of fine paper, to being an A\$7.5 billion global merchant of fine paper while retaining its Australian manufacturing arm. It did this by acquiring a series of paper-merchant subsidiaries in the UK, Europe, and North America as summarized in the Notes under Table 1. In particular, its purchase of Buhrmann NV in November 2003 for €700 million (A\$1.3B), made it one of the world's largest fine-paper merchants.

Table 1: Key Statistics, PaperlinX, Australia, 2000-2008

end June	2000	2001	2002	2003	2004	2005	2006	2007	2008
Sales revenue (A\$B)	1.58	2.36	2.96	3.61	6.22	7.58	7.39	7.82	7.49
Net Profit (A\$M)	86	106	123	132	109	169	65	74	72
Employees	2500	4100	3800	4800	9700	9500	9700	9500	9400
Notes	1		2		3		4		
Share price (A\$) end June	3.17	4.06	4.50	7.34	4.85	3.01	3.11	3.71	1.72
ASX All Ords Index	3205	3390	3175	3017	3519	4230	4909	6298	5333
Share price/Index, relative to share price in June 2000	1.00	1.25	1.48	2.55	1.44	0.75	0.66	0.62	0.34
US\$ for A\$1	0.60	0.51	0.56	0.68	0.69	0.76	0.73	0.85	0.96
Euro for A\$1	0.63	0.60	0.57	0.58	0.57	0.63	0.58	0.63	0.61

Notes:

1. De-merger from global packaging company, Amcor, in April 2000. Amcor's 2007 revenue was A\$10.9B.
2. PaperlinX acquired Spicers in January 2001 (>A\$200M) and Bunzl in the UK in mid 2002 (A\$377 million).
3. PaperlinX acquired the Dutch Buhrmann NV in November 2003 for A\$1.3 billion. This doubled employees.
4. PaperlinX acquired Cascades Resources in Canada in March 2006 for A\$100 million

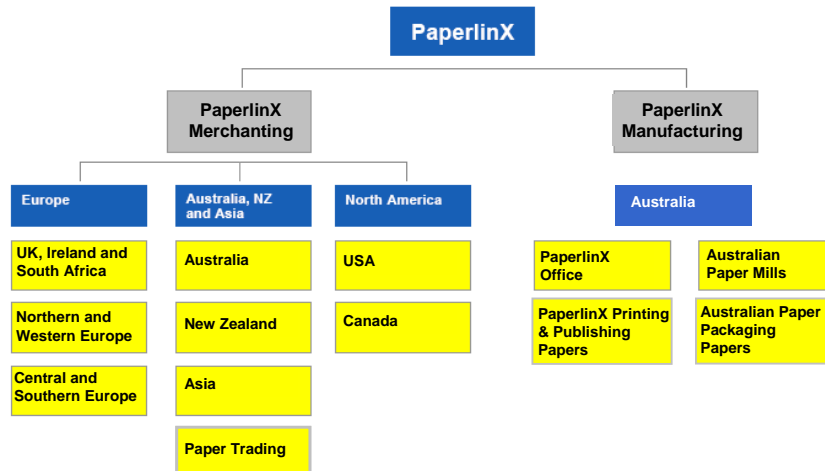


Figure 1: PaperlinX Organizational Structure, 2008 (Based on 2008 Annual Report)

According to its 2007 Annual Report, PaperlinX now operates 36 businesses in 27 countries. As shown in Figure 1, it is structured as two main divisions, Merchenting and Manufacturing, with 90% of its 2007 revenue coming from merchenting. In the three years to June 2007, PaperlinX had roughly 9,500 full-time equivalent employees and revenues of A\$7.5 billion. Not visible in Figure 1 is that most of the 36 businesses in PaperlinX are run as autonomous units. Local autonomy is so valued that PaperlinX is a highly decentralized organization:

“When we buy a paper merchant, all the value we acquire is within that local merchant and its local customer relationships. One of our core tenets is to respect that local relationship as a basis of our merchant model.”

(PaperlinX Concise Annual Report, 2007, p.10)

With respect to its size in its various markets, in the two years ended 30 June 2006 and 2007 PaperlinX’s revenues were A\$4.56B and 4.78B, respectively, in Europe, A\$1.15B and 1.38B in North America, and A\$1.23B and 1.03B in Australia. The rise of the Australian relative to the US dollar has impacted profitability from PaperlinX’s manufacturing plant, which operates only in Australia.

Fine-paper merchants act as intermediaries between paper manufacturers, on the one hand, and customers (mainly printers, copy shops, and offices), on the other. Manufacturers tend to produce large runs of a few grades of paper. Printing firms tend to need many grades of paper, often in a hurry. By purchasing paper from many different suppliers and holding inventory (Figure 2) close to their customers, paper merchants add value by being able to provide and ship paper to their customers, usually within 24 hours of it being ordered (Figure 3).

Fine-paper merchenting is thus a low-margin high-volume business based on buying and holding paper in large warehouses, an order-taking function that knows accurately how much inventory of each stock-keeping unit (SKU) is in store, and some sort of trucking organization to deliver goods to customers. Selling prices are very competitive, so profits are driven by good service, good customer relationships, accurate record keeping (knowing what inventory you have and how much it cost), and supply-chain optimization. For a large company such as PaperlinX, potential economies of scale exist in the areas of discounts for high-volume purchasing from its suppliers, efficient supply-chain management (including shared logistics in countries with more than one subsidiary), and shared administrative and IT services. As indicated by the drop in “Share price/ASX All Ordinaries index relative to the share price in June 2000” in Table 1, returns have not been good for PaperlinX investors over the past few years. This means that in terms of the Broadbent and Kitzis (2005) CIO framework, PaperlinX is probably operating somewhere between “maintaining competitiveness” and “fighting for survival”.



Figure 2: Buhrmann Ubbens warehouse, Netherlands



Figure 3: Some of Buhrmann's fleet of 50 trucks

Source of photos: http://www.PaperlinX.com/cpa/dat/download_file/Europe%202027-11-06.pdf

IT IN PAPERLINX AUSTRALIA

In April 2000, when PaperlinX “de-merged” from Amcor Ltd, the deed of arrangement specified that all of its IT would continue to be managed by Amcor. From Amcor, PaperlinX inherited partial ownership of a huge range of legacy systems, e.g., one third of a mainframe, one third of an HP Unix environment, one third of an AS400, and a wide range of software. Late in 2000, David Walker was hired as IT manager by PaperlinX to manage the IT services provided by Amcor. In June 2001, Amcor entered a 5-year A\$200 million all-of-IT outsourcing arrangement with Siemens (Lebihan 2001). In effect, PaperlinX was outsourced to Amcor, and Amcor was outsourced to Siemens. However, it soon became apparent that this was a “winner’s curse” deal (Kern et al. 2002). So in December 2003, after much angst, Amcor and Siemens agreed to terminate their contract. Amcor then signed a US\$115 million (A\$180M) 5-year contract with Hewlett Packard (Hewlett Packard 2003). Since PaperlinX and Amcor still shared many systems, PaperlinX signed a parallel contract (with identical terms) with Hewlett Packard. Since then, the two businesses have slowly “de merged” their IT systems. Today they are completely independent of one another.

Also in 2001, PaperlinX entered into a three-year contract with SAP to implement an SAP ERP system. Here, Walker decided it would be cheaper to manage the business side of the project, e.g., specification of business requirements, process mapping, etc., inhouse. So PaperlinX began to build up an in house SAP team. On November 2002, PaperlinX announced the successful implementation of R/3 in two paper mills in Tasmania (PaperlinX 2002). Today, most of the PaperlinX business in Australia is supported by its SAP system, and PaperlinX has a 30-person SAP support team in house.

During the period 2000-2005, Walker maintained a trusted-advisor role to the then CFO, who resigned in November 2005 (PaperlinX 2005). In particular, he assisted with due diligence during the Buhrmann acquisition in 2003, including pointing out that the various legacy systems in the many Buhrmann subsidiaries needed major upgrades. He also succeeded in maintaining a good relationship with Siemens during the difficult time with the outsourcing contract with Siemens. From 2005, most of Walker’s attention was directed to Europe and USA.

IT IN PAPERLINX EUROPE

As indicated earlier, PaperlinX Europe is a loose collection of many largely autonomous wholesalers most operating in different market segments in 24 different countries. With various acquisitions, divestitures, and mergers taking place of companies in different countries, and a business model that put local autonomy first, there was little management time or desire to upgrade or centralize IT systems. Thus by early 2005, fifteen months after the purchase of Buhrmann, each European subsidiary still had its own warehouses, its own trucking organization, its own IT staff and computer systems, and none were keen to cede control of any part of their operations to some central function. There were 20-or-so different IT systems, including a number of mid-range ERPs, on platforms ranging from mainframes to PCs, each managed by IT staff in the different subsidiaries.

Responding to pressure to reduce costs, Walker (now CIO) explored ways of upgrading and possibly centralizing the often antiquated IT systems in the various European organizations. After visiting the European businesses, and discovering that most of them—having been starved of cash during the Buhrmann era—were keen to upgrade their IT systems, Walker invited all financial controllers and IT managers to a meeting in Amsterdam in early 2005. He asked. “Do you need new IT systems?” and “Should we be leveraging our buying

power by having everyone use the same system?" The answers were Yes and Yes. His next question was: "Who's got a system that they think we should implement in all the other businesses in Europe?". No one put up their hand. No one had a system that they thought everyone else would benefit from using.

Walker and his team therefore did some research of their own and eventually found themselves in the offices of a supply-chain software vendor called IBS, in Sweden. According to IBS (2007, p.10), in 2007, Gartner ranked IBS seventh in the world rankings of "Leading Global Vendors of Supply Chain Software", after SAP 20%, Oracle 15%, Infor 3.5%, Ariba 3%, i2 3%, Manhattan 2.5%. After exploring the functionality of IBS' papermerchanting solution, Walker's Australian SAP manager concluded that for PaperlinX Europe's purposes, the software was an excellent fit. Further, preliminary negotiations with IBS suggested that software licensing and implementation costs would also be satisfactory.

Having found what appeared to be an excellent package at a good price, Walker asked himself how to persuade general managers in the 24 European countries to agree to implement IBS. His problem was that because local autonomy was so highly valued at PaperlinX, senior management was not prepared to mandate the upgrading of computer systems in Europe, let alone propose some sort of shared services vision. Walker was therefore forced to rely on influence and relationships, not a management edict, to persuade general managers in the European businesses to consider standardizing on the one package.

Walker's method of achieving "buy in" was simple but effective. First, he approached each of the 24 businesses and asked them to put together a series of scenarios defining the functionality that they needed to run their business. The businesses were motivated to do this because the CEO had announced that although there was no need to upgrade to a new system immediately, when the time came to ask for funds to upgrade, everyone would have to implement the same system. Using the scenario information, Walker's team was able to present IBS with a comprehensive list of software requirements.

Second, he announced to the European businesses that April 2005 was IBS Month. Week 1 was for sales order processing, week 2 finance, week 3 logistics, and week 4 was for inventory management. Then he said:

"We want you to send us as many of your best people from each of these areas to spend a week in Amsterdam to 'rip this software apart'. We'll get the vendor to demonstrate the software. We want you to ask the vendor any questions you want about the software. And we said: At the end of each day you will need to score the scenarios out of ten. ... And it will be zero 'hopeless'; 10 'walks on water'; anything below 5 'I cannot implement this in my business'; anything above 5 'I can implement it'; the closer you get to 10 the less butts there are. Okay. And we want you to do that for each scenario, and at the end of the day, we want you to do it for the entire module."

The transcript continues:

"Bear in mind these guys were all very loyal to their own systems. You know, 'I'm an AS400 man'. 'I'm a RISC man.' 'I'm a mainframe guy.' Right? They all came with their own prejudices. So we had some rules up. 'If you're going to ask a question it's got to be based on facts and data. If you want something answered and the vendor can answer the question, they can demonstrate it, or they can take the question on notice and can come back to you with a written response within two days.'

"This went over a period of 30 days. At the end of it, every single response sheet from every single person that attended had a score for everything above five with the exception of one thing for one guy on one day. And it was for a thing called EVA, economic value add. After discussions, the vendor agreed to modify the software to handle EVA. The average score was 8.2. 8.2 out of a bunch of guys loyal to their own systems that had never seen the IBS software before!"

At that stage in the interview, Walker paused to explain why he arranged things this way:

"The problem was that I didn't have managing authority to standardise business processes. I didn't have the authority to do that. What I had to do was accept the fact that this guy has a business process completely different to this other guy, but the software must be configurable to do both. ...I'm sure most people in IT would have the horrors if you told them I did a one horse race! I mean, it's very contrary, I think, to what most people would normally do."

But IBS Month did build consensus:

"It did. I mean, and that's exactly where we ended up. We ended up where we got agreement. It just meant that the software had to be configured differently for this group and this group, but we got consistency."

Third, he reported summary scores to senior management in both Europe and Australia:

We "put the summary together and went back to the businesses at the end of the month and said this is how you scored it. So we went back to the European management team and we said: 'This is what your people said.' And at the same time I reported back to the Board and the management group in Australia and saying

‘It looks like we have a winner. We’ve negotiated a very good price. We need to start putting together a plan to do a pilot study.’

Not long after the European CEO agreed to adopt the IBS solution. Extracts from an IBS press release dated 3 October, 2005, sum up the situation:

“IBS has signed an agreement with PaperlinX regarding the planned roll-out of IBS’ specialised software solution for the Paper and Packaging industry, IBS Paper. The agreement covers the terms and conditions for software installations for 4,000 users in 18 European countries.”

“PaperlinX plan to streamline operations and consolidate the different ERP-systems used in the Group today to one ERP-system, IBS Enterprise. The roll-out will begin with a pilot installation in 2005. The agreement between IBS and PaperlinX covers the terms and conditions for the planned installation of IBS’ specialised supply chain focused ERP solution for the Paper and Packaging Industry throughout PaperlinX operations in its European operating companies. The IBS Paper solution covers CRM and sales order management, distribution and warehousing, planning and forecasting, SRM and procurement, financial management, business intelligence and performance measurement. As the European roll-out is progressing, PaperlinX will evaluate the installed solution and decide on installations in other PaperlinX units in Asia and North America.”

Fourth, it was decided that the first implementation would be a small one in Ireland, a 70-seat implementation. A team of six experts from IBS and six key people with expertise in logistics, order entry, accounting, etc. from various PaperlinX businesses was assembled to do the implementation in Ireland. The system ran on an AS400 server rented from IBS in Stockholm. It took 9 to 12 months to (a) build the prototype, (b) do the modifications for Ireland, and (c) implement the system. “It flew.” Since the Irish firm had limited IT people, a Help desk was set up in the IT office in an English subsidiary.

Fifth, they got agreement to implement IBS in Germany, one of PaperlinX’s largest European businesses, with 600 seats. Germany was keen to get off its expensive aged mainframe-based system.

“Germany has got like 40 locations, 800 users. You know, it was big. And it was integrated into a lights-out warehouse. You name the complication, it had it. But we got agreement to go and do Germany. Then what we said was, well, if we get Germany up and running, which is the next country? Which is the next business to do it? And the UK business said, ‘Hey, we want to go next’. And so we got agreement to actually move that team of six people to a team of 12 people and do two parallel implementations, one in UK, one in Germany. Because, remember, that team of six that we had over in Ireland were there to help the Irish implementation and train up on IBS. So we’ve now got six people that are trained. So we split that team of six in half and put three in Germany, three in the UK, and six fresh heads. The six people from IBS would spend their time floating between the two to add that level of technical expertise that wasn’t in our team.”

“Meanwhile things are going well in Germany and we’ve got a new CFO in Europe. The new CFO joined us from the Dutch aviation company, KLM. He’s used to standard business processes, standard systems, running an outsourced data centre. He walks in the room and says, ‘David, why have we only got two teams doing this?’ ‘Cause I can’t get the resources to do more.’ ‘Leave it with me.’ All of a sudden I’ve got three teams of six, right. And I’ve got someone working on reporting on top of all of that, because the CFO wants corporate reporting. So that’s all coming together.” Then he says: ‘What are we doing about data centres?’ ‘Well we’re renting time on the one in Stockholm. My view is that we should put one in the UK, one on continental Europe, and have a disaster recovery box just sitting in the data centre in Stockholm.’ ‘Why do we need three? Why can’t we just have one?’ Well we go through the idea of disaster recovery, then look at the cost of the boxes. It was actually more economic to buy three medium-size boxes than two big ones.”

Moreover, there were clear economic incentives for the businesses to share servers:

“And then there was the political issue about each area wanting to have its own box. .. When Germany came to implement it they say ‘We need our own box.’. And the team says ‘Well, we’ve got some spare space on this box we just bought up in Stockholm’ ‘Oh, what’s that one for?’ ‘That’s our research and recovery box but you can run on that one for now.’ ‘Oh, but we want our own.’ ‘Well it’s going to cost you half a million Euros.’ ‘Oh, we’ll run on the one in Stockholm then.’ ‘Okay’. So we’ve now got the second business not running its own box. ...So it started to gain momentum.”

Walker also started to move PaperlinX Europe towards consolidating all their applications, not just IBS, on only three servers:

“Meanwhile, pressure’s coming from Australia to Europe to start reducing its head count and save money and they’re putting up a proposal to the Board to roll this software out across the whole of Europe. So then they agreed that they were going to start consolidating data centres, consolidating IT staff....for the ERP only. Fine. So we got a general-principle agreement on that, no problem. Then we start implementing.

We've got, now, based on the cost of bandwidth and the things that you want to do, we're probably better off delivering this with Citrix. Oh, okay, so we need to standardise the roll out of Citrix. Okay. By the way, you've got an email server and a file and print server there. Why don't we put those in the data centre in Stockholm as well? Okay.

"So it's been done by stealth. And in the end management said we should be closing all the data centres down, we should be centralising everything then. Absolutely. So it's one of those things where we started off with the ERP and then logically, well I'm going to put the comms into your country anyway 'cause I got to take you back to the data centre. So we may as well put everything down that pipe 'cause bandwidth is cheap. So we've now got an agreement, going forward, that there will be one data centre in continental Europe, in Amsterdam, one in Northampton, in the UK, one in Stockholm. ... and that'll be for the roll out over the next five years. But, at the end of that five year roll out, when you're then looking at reinvesting in technology, you've then got the opportunity of revisiting that and saying do I really need three? Do I need two? So, again it's all progressing down that path."

Today, in mid 2008:

"we are now on the cusp of a major roll out in Europe. We've resourced up to get to a point where we've got three parallel teams ready to roll. Germany's in. One of the three UK businesses has gone live. The second UK business has started working on its own implementation. They're already well down the track with process maps and gap analysis and whatever. That implementation will move quickly."

"PaperlinX management has now recognised that they can't make progress on a lot of fronts without a standardised IT system and therefore are putting huge pressure on the European management to start implementing."

"The other thing that's happening is that [the European CFO] started saying: 'I don't understand why everybody does accounts receivable differently. There should only be one accounts receivable process.' So in parallel with the roll out of the standard system, he's now putting together a task force to start looking at process standardisation. So we're getting there by stealth, you know. It's taken a long time. Now I haven't even spoken about the US. That's another story."

There is not space in this paper to tell the North American story, except to say that there, as in Europe, Walker has also followed an opportunistic approach. For example, when the software maintenance contract at one business could not be extended, he guided that firm towards a standard platform for North America (not IBS).

EVALUATING THE CIO-ROLE TYPOLOGIES (RESEARCH QUESTION 1)

This section evaluates the usefulness and completeness of the Broadbent and Kitzis (2005), Kaarst-Brown (2005) and Leidner and Mackay (2007) CIO-role typologies. Recall that Broadbent and Kitzis (2005) argue that CIOs may play (1) either a *trusted senior executive leader* or a *chief technology mechanic* role that (2) differs markedly depending on whether the CIO's organization is (a) fighting for survival, (b) maintaining competitiveness, or (c) breaking away, and (3) the CIO is a corporate CIO or a regional/divisional CIO. Are these three characteristics important in describing the CIO role at PaperlinX?

With respect to criterion 3, the CIO at PaperlinX was the corporate CIO. He had only "dotted line" authority over the way IT was managed in the 36 subsidiary businesses. His role would have been very different if all IT staff, across all the businesses, reported direct to him. So Yes, criterion 3 is both relevant and important at PaperlinX.

With respect to criterion 2, as shown by the declining share price relative to the market index in Table 1, PaperlinX is currently operating somewhere between *maintaining competitiveness* and *fighting for survival* (with differences across regions). Thus despite the fact that business units in many countries were begging for their systems to be upgraded, the CIO at PaperlinX had to search out a cheaper mid-tier software vendor, then roll out the software incrementally across Europe. His role could have been very different if he'd had more funds. So Yes, criterion 2 is both relevant and important for understanding the role of the CIO at PaperlinX.

With respect to criterion 1, concepts from Broadbent and Kitzis (2005), Leidner and Mackay (2007), and Kaarst Brown (2005) are mapped in Table 2. The first three rows in Table 2 identify similar concepts, though there is no match for Leidner and Mackay's "value adding" role in Broadbent and Kitzis' dichotomy. In addition, there is no match in the first two columns for the last two concepts in Kaarst-Brown (2005). At various times in PaperlinX, IT appears to have played a "necessary evil" and "support" role, where the job of the CIO was to "keep it running" or "value adding". Thus Kaarst Brown's identification of the organization's dominant assumptions about the role of IT, and Leidner and Mackay's levels of IT-leader visibility are both useful for understanding the role of the CIO at PaperlinX. However, neither of Broadbent and Kitzis' criterion 1 categories in column 1 of Table 2 really fits. For example, although CIO Walker had the vision in 2003 of how

new supply-chain software could help the sprawling European organization lower its cost of doing business, his vision was subordinated to other programs for some years. His eventual success in getting his vision moving in Europe was achieved only after IBS month and the demonstrated successes in Ireland and Germany. So for some years, Walter was neither a *trusted senior executive leader*—in the sense that he influenced business strategy—nor a *chief technology mechanic*. This analysis suggests that Leidner and Mackay’s classification, or possibly a finer-grained classification still, would be a useful replacement for Broadbent and Kitzis’ current criterion 1.

Table 2: Comparing the CIO typologies

Broadbent and Kitzis (2005) roles of the CIO (criterion 1)	Leidner and Mackay’s (2007) (Fig.5) levels of IT-leader visibility	Kaarst Brown (2005) “dominant assumptions about the role of IT”
Chief technology mechanic	Keep it running	Necessary evil
-	Value adding	IT is support not partner
Trusted senior executive leader	Big bang	Equal Partners
-	-	Business can do IT better
-	-	IT rules!

EVALUATING THE MODELS OF CIO EFFECTIVENESS (RES. QUESTION 2)

This section evaluates the explanatory power of the Broadbent and Kitzis (2005) and Smaltz et al. (2006) models of CIO effectiveness.

1. Broadbent and Kitzis’ CIO-effectiveness model

Broadbent and Kitzis (2005) argue that the most effective CIOs are those who play the “trusted executive leader role”. Such CIO leaders have a “clear and compelling” vision about how IT should be used in their organization, are able to communicate that vision effectively to members of the executive team, and build strong relationships with executive colleagues. Second, because they have “no formal organizational power” over their executive peers they rely on persuasion, relationships, and their own personal credibility to “lead from the back”. Finally, according to Broadbent and Kitzis, CIOs’ effectiveness depends not on their technical knowledge, nor their capacity to deliver projects on time and under budget—though these are important—but rather, on the CIO’s demonstrated success in managing various IT initiatives that deliver benefits to the organization.

How well does the Broadbent and Kitzis model describe CIO effectiveness at PaperlinX? First, for the reasons explained above, during the past three years the CIO at PaperlinX does not appear to have played a trusted-executive role. This is certainly the case in Europe. Thus Broadbent and Kitzis might argue that their model does not apply at PaperlinX. However, much of what they say about what makes an effective CIO still applies. At PaperlinX, David Walker did have a clear vision of how IT could be used in his organization. His difficulty was that most managers in the organization were not ready to accept his vision as the path forward. He was therefore forced to build support for his vision, almost by stealth (and later with the support of the new European CFO), from the grass roots of the organization. However, Broadbent and Kitzis’ arguments about the CIO having no formal organizational power over his executive peers, and the need to rely on persuasion, relationships, and his own personal credibility are very true at PaperlinX. Moreover, the “IBS Month” exercise, and subsequent delivery of centralized-server-based systems in Ireland and Germany (not just for the IBS software), clearly served to build the CIO’s credibility in PaperlinX Europe. Evidence of that success is now driving PaperlinX Europe’s current push to roll out IBS to its other business units. Thus much of what Broadbent and Kitzis say about the drivers of CIO effectiveness also apply in the PaperlinX case. This suggests that Broadbent and Kitzis’ (2005) model has broader applicability than just to CIOs in a trusted-executive role.

2. Smaltz et al.’s CIO-effectiveness model

Smaltz et al. (2006) argue that CIO effectiveness is driven primarily by (1) the CIO’s effectiveness in (a) contributing to the formulation of business strategy, (b) managing relationships with IT suppliers, and (c) integrating IT-based systems within the organization, and (2) the CIO’s personal capabilities, including his/her (a) effectiveness in building trusting relationships with the business, (b) political savvy, (c) strategic IT knowledge, (d) strategic business knowledge, and (e) interpersonal communication skills.

How well does the Smaltz et al. model describe CIO effectiveness at PaperlinX? First, with respect to point 2, Walker’s efforts with IBS Month and implementations since then show that Walker exercised considerable

political savvy and effective interpersonal communication skills in building trusting relationships with the various business units. Second, with respect to point 1(a), the current efforts to roll out IBS in PaperlinX Europe show that Walker's efforts have eventually contributed to the formulation of what is now business strategy. Third, with respect to point 1(b), Walker's success in managing relationships with SAP and the outsourcers in Australia, IBS in Europe, and the major software vendor in the US (not elsewhere discussed in this paper) have clearly contributed to the business value of IT at PaperlinX. Finally, with respect to point 1(c), Walker's efforts to achieve greater systems integration, both through investing in integrated ERP-type packages, and in having multiple applications share common infrastructure, is evidence of effective integration. Thus, all four drivers of CIO effectiveness in the Smaltz et al. model (1a, b, c, and 2) were important in the PaperlinX case.

CONCLUSION

The purpose of this paper has been to use data from a detailed case study of a A\$7.5 billion global fine-paper merchandising company, PaperlinX Ltd, to assess the descriptive completeness of three CIO typologies, and the validity of two models of factors affecting CIO effectiveness. With respect to the typologies, our conclusions are that all three typologies (Broadbent and Kitzis 2005, Kaast Brown 2005, and Leidner and Mackay 2007) were useful, but that Broadbent and Kitzis' binary *trusted senior executive leader* versus *chief technology mechanic* classification appears too restrictive. In fact it would appear useful to augment that binary classification with a finer-grained classification along the lines of that in Leider and Mackay (2007). With respect to the two models of CIO effectiveness, our conclusions are that all factors in both models were applicable and important in the PaperlinX case. Our one suggestion here is that Broadbent and Kitzis' claim that their model is only applicable for *trusted senior executive leader* may be too restrictive. The factors they identify were important in the PaperlinX case even though the CIO did not play a true trusted-senior-executive role in Europe.

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