

Chapter 2

Business Processes, Information Systems and Information

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Study questions

- Q1 Why does \$RU need to understand business processes?
Q2 How can business process modelling help organisations?
Q3 How can information systems improve process quality?
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Q5 What data characteristics are necessary for quality information?

The guide—understanding perspectives and points of view

1. Consider the following statement: 'The quality of your thinking is the most important component of an information system.' Do you agree with this statement? Do you think it is even possible to say that one component is the most important one?

Student answers will vary, but bring to the discussion the old computer saying 'garbage in garbage out' (GIGO) which relates just as much to your thought processes as to the quality of the data you use in your information systems. See this website for the origins of GIGO
<http://en.wikipedia.org/wiki/Garbage_in_garbage_out> accessed 31/03/2015.

2. Although it doesn't appear to be so, the statement 'there are five components of an information system: hardware, software, data, procedures and people' is an opinion based on a perspective. Suppose you stated this opinion to a computer engineer who said, 'Rubbish. That's not true at all. The only components that count are hardware and maybe software.' Contrast the perspective of the engineer with that of your MIS lecturer. How do those perspectives influence their opinions about the five-component framework? Which is correct?

Traditionally, software engineers blame the hardware, hardware engineers blame the software, and all of them blame the users. So this question should lead to some interesting discussion from the students. These websites give a good view of the hardware versus software perspective and whether software is more important to Google than end users.

- Software Experience is More Important than Hardware Specs
<www.youtube.com/watch?v=qa-X7WtkjDM> accessed 31/03/2015.
- Optimize for Search Engines or Users?
<www.youtube.com/watch?v=vnFCGqySlv8> accessed 31/03/2015.

3. Consider Bateson's definition, 'Information is a difference that makes a difference.' How can this definition be used to advantage when designing a web page? Explain why someone who specialises in quantitative methods might consider this definition to be useless. How can the same definition be both useful and useless?

From the textbook (page 31) is this explanation of Bateson's definition:

By this definition, there are many differences, but only those that make a difference qualify as information. This definition is informative and useful. It

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is imprecise, but it is a pretty good guideline and it can be used to advantage when designing reports and queries for end users: Does this report show people a difference that makes a difference to them?

Get the students to read this Wikipedia entry which gives an overview of Bateson and his ideas—it should widen their understanding of end users as people:

- Gregory Bateson < http://en.wikipedia.org/wiki/Gregory_Bateson > accessed 31/03/2015.

People who use quantitative data and information will answer Bateson's definition as described in the Guide:

Colleagues who specialise in quantitative methods, however, find Bateson's definition vapid and useless. They ask, 'What does it say?' or 'How could I possibly use that definition to formalise anything?' or 'A difference that makes a difference to what or whom?' Or they say, 'I couldn't quantify anything about that definition; it's a waste of time.'

To answer the question about useless or useful, students should be discussing different viewpoints and professions and their (necessary) perspectives and biases.

4. Some students hate open-ended questions. They want questions that have one correct answer like '27.3 kilometres per hour'. When given a question like that of Question 3, a question that has multiple, equally valid answers, some students get angry or frustrated. They want the book or the lecturer to give them the answer. How do you feel about this matter?

Students have to come to terms with the uncertainties that their professional careers will present to them; there will never be just one answer to every problem they come across in their careers or their lives. Their perspectives need to be validated, but this is a good place to have a discussion about resilience in professional life and coping with uncertainty. It will be helpful to them if you share your professional experiences with them. This website has some interesting case studies on people who work with uncertainty:

- Working in uncertainty—inspiring case studies
<<http://www.workinginuncertainty.co.uk/cases.shtml>> accessed 31/03/2015.

5. Do you think individuals can improve the quality of their thinking by learning to hold multiple, contradictory ideas in their minds at the same time? Or do you think that doing so just leads to indecisive and ineffective thinking? Discuss this question with some of your friends. What do they think? What are their perspectives?

Student answers will vary here.

Green IT guide—'whole-of-government' approach to Green IT

Goals

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- Teach students about the role of information systems and information technology in environmental sustainability.
- Discuss a particular problem and solution as presented in the case study.
- Understand the direct contribution of information technology to emissions.
- Understand how organisations can tackle their overall environmental footprint by using information technology.

Background and presentation strategies

There is worldwide concern regarding climate change and environmental sustainability issues. Environmental sustainability is about meeting the needs of present generations without compromising the ability of future generations to meet their needs. It involves product stewardship to minimise the environmental footprint of products during use, the use of clean technologies to reduce the use of polluting materials, and the prevention of pollution at the end of a product's use. Organisations are under increasing pressure from customers, shareholders, government and the public to improve their environmental sustainability—increasingly, they are having to respond to legislative changes that require them to improve their environmental credentials. IS professionals are expected to play a significant role both in addressing the environmental impact of information technology itself and in applying information technology to address sustainability issues elsewhere in the organisation.

The combination of environmental sustainability and IT is referred to as 'Green IT' and may be defined as:

Green IT is an organisation's ability to systematically apply environmental sustainability criteria (such as pollution prevention, product stewardship, use of clean technologies) to the design, production, sourcing, use and disposal of the IT technical infrastructure as well as within the human and managerial components of the IT infrastructure.

In summary, 'Green IT' can help organisations mitigate the direct contribution of information technology to emissions as well as assist organisations to tackle their overall environmental footprint by using information technology as part of the solution to improve an organisation's environmental sustainability.

This textbook features case studies across a range of Green IT practices. These case studies cover a wide variety of the different business and technology innovations that are available today and illustrate, through practical know-how, the application and insight needed to implement and execute Green IT initiatives in order to realise benefits at an organisational and environmental level. Each of the case studies is presented in a consistent format:

1. The client problem—what was the issue that needed to be addressed?
2. What was the solution proposed by your company and/or partners to address this problem?
3. What was the net result of the application of the technology to:
 - a. efficiencies, for example, cut in carbon;
 - b. productivity in staff;
 - c. financial, for example, initial cost to invest in new technology, how after two years this has reduced expenditure for the business unit by more than 50

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- per cent, that is, we have paid it back and the investment is now making the business line more profitable, etc.;
- d. any cultural shift or changes that were hurdles, etc.; and
 - e. other areas of significance.
4. Application to other businesses; for example, this was a large-scale/small-scale project but the same principles can be applied to an SME, etc.
 5. A quote from someone involved in the project.

Answers to discussion questions

1. Is it sufficient for the federal government to lead by example or is there a need for legislation to require private and public organisations to adopt Green IT initiatives?

Student answers will vary here depending on their individual views on the role of government and legislation in business and society. Interesting discussions should arise!

See this YouTube video (and others in the same series) for useful background on Green IT:

- ICT Green Boot Camp Session 1—part 2
<www.youtube.com/watch?v=B6jyBjnbuKs&list=PL0E0840A91EF95CB8> accessed 31/03/2015.

2. Is this initiative applicable to other businesses? Does the size of the federal government mean that this approach is only viable for large organisations?

It is relevant to any organisation—large and small—because it enables organisations to conduct an assessment on their ‘footprint’ using the six environmental standards. This advice is very useful for SMEs and busy professionals who are time poor. Larger organisations will find the initial six environmental standards useful for building a business case for a more detailed assessment or specialised focus.

3. Why should ICT procurement be singled out for such a policy approach?

See these websites for evidence of the need for policy for ICT procurement:

- Green ICT <<http://www.cepis.org/index.jsp?p=827&n=1152>> accessed 31/03/2015.
- Computer Recycling
<http://en.wikipedia.org/wiki/Computer_recycling> accessed 31/03/2015.

Using your knowledge

1. Consider the four definitions of information presented in this chapter. The problem with the first definition, ‘knowledge derived from data’, is that it merely substitutes one word we don’t know the meaning of (information) for a second word we don’t know the meaning of (knowledge). The problem with the second definition, ‘data presented in a meaningful context’, is that it is too subjective. Whose context? What makes a context meaningful? The third definition, ‘data processed by summing, ordering, averaging, etc.’, is too mechanical. It tells us what to do, but it doesn’t tell us what information is. The fourth definition, ‘a difference that makes a difference’, is vague and unhelpful. Also, none of these definitions helps us to quantify the amount of

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information we receive. What is the information content of the statement that every human being has a navel? Zero—you already know that. However, the statement that someone has just deposited \$50 000 into your bank account is chock-full of information. So, good information has an element of surprise.

Considering all of these points, answer the following questions:

a. What is information made of?

Information is made of data that has been processed in some way to be meaningful to the recipient.

b. If you have more information, do you weigh more? Why or why not?

If you are carrying around a 1000-page report that contains information, then you might say information causes you to physically weigh more. In most situations, however, having more information does not result in a weight gain. It results in a change in your brain.

c. If you give a copy of your transcript to a prospective employer, is that information? If you show that same transcript to your dog, is it still information? Where is the information?

A transcript from a prospective employee is meaningful to an employer trying to fill a position. The content of the transcript (subjects taken, grades earned) has value in the hiring context. A dog has no use for the content of the transcript and so it has no value to him. If the piece of paper the transcript is printed on is crumpled up, then it might have value to the dog as an item to chase or tear up (depending on the dog).

d. Give your own best definition of information.

Student answers will vary. Despite its subjectivity, I still like 'information is data that is meaningful within a context'. Also, look for the fact that data usually must be transformed in some way to be meaningful, and, to provide value, the information must make a difference to the recipient.

e. Explain how you think it is possible that we have an industry called the information technology industry, but we have great difficulty defining the word 'information'.

We have many everyday terms that are difficult to define. We speak of the healthcare industry, but we typically only define 'health' in the negative (the absence of disease). This is just another example of a term that is broadly understood but difficult to define precisely.

2. Suppose you manage the buyers in your organisation and you have been asked to help determine the requirements for a new vendor selection information system. As you think about those requirements, you wonder how much autonomy you want your employees to have in selecting the vendors and products to sell. You can develop a system that will make the vendor/product selection automatically, or you can build one that allows employees to make that selection. Explain how this characteristic will impact:

a. The skill level required for your employees.

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A system that automatically selects the vendor/product will require employees with fewer skills than would a system that allows the employees to make that selection. With an automated system, the employee simply needs to inform the system that a vendor/product selection must be made, the system makes the selection and the employee sends the purchase order to the selected vendor. With a manual system, the employee must weigh the relevant selection factors and use his or her knowledge, experience and judgment to select the vendor/product.

b. The number of employees you will need.

Use of a system that automatically selects the vendor/product will reduce the number of employees needed, because a portion of the business process has been moved to the computer side and less work is done on the human side. With a manual system, more work is performed on the human side, thereby requiring more employees.

c. Your criteria for hiring employees.

A system that automatically selects the vendor/product will simplify employee-hiring criteria. As the procedures followed on the human side have been simplified, lower standards in terms of experience and knowledge of purchasing will be acceptable. With a manual system, employee-hiring criteria will be higher and more complex, because employees with experience and a good understanding of vendor/product selection decisions will be needed.

d. Your management practices.

When using a system that automatically selects the vendor/product, management oversight will focus primarily on ensuring that the rules followed by the system are correctly established. Once established, management can rely on the system to follow these rules. With a manual system, management will need to ensure that the employees are properly trained and then continual management oversight will be needed to monitor employees' performance and ensure that proper vendor/product selection decisions are being made.

e. The degree of autonomy for your employees.

A system that automatically selects the vendor/product substantially reduces employee autonomy. A system that gives the employee the task of selecting the vendor/product makes the employee much more autonomous and adds a considerable amount of interest and challenge to the job.

f. Your flexibility in managing your department.

Having a human perform the selection of the vendor/product will keep the management of the department much more flexible. As vendor/product selection criteria change and evolve, it will be much easier to modify and adapt the behaviour of humans in performing this task. Although the computer can follow whatever decision rules it has been given quite easily, it is harder to quickly and easily adapt the rules it follows. In addition, the computer cannot recognise situations in which its rules need to be changed, whereas a human can recognise that changing environmental conditions may

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necessitate a change in selection criteria.

3. Suppose management has left you out of the requirements-definition process for the development of the system in Question 2. Explain how you could use the knowledge you developed in answering this question to justify your need to be involved in the requirements definition.

If I (as Buyer Manager) am left out of the requirements-definition process, I will not be able to contribute my knowledge and expertise about vendor/product selection to this critical system development process. Without that knowledge, the development team may decide to automate this process because of factors such as cost savings, efficiency and the consistency of this approach. Although these are important factors, my input can point out the other important issues, such as employee autonomy and management flexibility. It is important that all sides of the issue are explored before a key decision such as this is determined.

Collaboration exercise 2

1. In Figure 2.5, explain why inventory must be allocated.

Inventory must be allocated to an order during availability checking so that the inventory on hand is not sold to another customer. Reserving the inventory for this order reduces the quantity available to fill other orders. If the order is later rejected because the special terms are not approved, then the inventory must be released and added back to the quantity available to fill orders, so that subsequent orders are not incorrectly rejected for insufficient inventory available.

2. Using Figure 2.5, explain why credit must be allocated to customers. What is the business consequence if these allocations are not adjusted when special terms are not approved?

Customers are typically granted a specific credit limit based upon an analysis of the customer's creditworthiness. When a customer buys more products on credit, the amount of available credit must be reduced by the amount of the purchase. This prevents the customer from purchasing more than his or her credit limit. If the customer order is rejected due to disapproved special terms, the customer's available credit must be increased by that purchase amount. Otherwise, the customer's available credit is smaller than it should be and the customer will be prohibited from utilising the entire credit line for future purchases.

3. Recommend a process for adjusting credit for orders for which credit or special terms are not approved. Indicate which role makes the adjustment and how they receive the data for doing so.

When an order is rejected due to insufficient credit or unapproved special terms, notification of the rejected order should flow to a person who can remove the charge to the customer for the order. In order to maintain separation of duties, this person should be someone other than the person working on the order-approval process.

4. Change the process in Figure 2.5 so that allocated inventory is returned when credit or special terms are not approved. Indicate which role makes the

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adjustment and how they obtain the data for doing so.

When an order is rejected due to unapproved credit or special terms, notification of the rejected order should flow to a person who can release the reserved inventory for the order. In order to maintain separation of duties, this person should be someone other than the person working on the order-approval process.

5. There are six different sequences for the three approval tasks in Figure 2.5. Name each and select what your team considers to be the most promising three.

Sequence 1: check credit; check inventory; check special terms (current sequence).

Sequence 2: check inventory; check credit; check special terms.

Sequence 3: check credit; check special terms; check inventory.

Sequence 4: check special terms; check credit; check inventory.

Sequence 5: check inventory; check special terms; check credit.

Sequence 6: check special terms; check inventory; check credit.

The most promising sequences are 4, 5 and 6.

6. Evaluate each of the three sequences you selected in Question 5. Identify which sequence you think is best.

Student answers will vary. Here is one rationale that is logical:

Sequence 4 (check special terms; check credit; check inventory) is the most promising. Not every order includes special terms, so many orders will pass immediately to step 2. Checking special terms first does not involve any database updates that must be reversed if the order is later rejected. In addition, if the special terms cannot be met, the order could potentially be renegotiated by the salesperson and customer so that terms that can be approved are included.

Checking credit second is preferred because this issue pertains only to the customer. If insufficient credit is available, the salesperson and customer should be notified so that possibly an alternate payment method could be arranged or the quantities ordered could be reduced.

Checking inventory last is preferred because this step reserves inventory for that customer, meaning we no longer can sell that inventory to anyone else. This step has the most significant impact on our business because by reserving that inventory we cannot sell it to anyone else. We do not want to risk losing a subsequent sale due to insufficient inventory when the order that is reserving the inventory has at least some likelihood of being rejected.

7. State the criteria you used for making your selections in Questions 5 and 6.

The criteria that are illustrated are (1) flexibility—by placing the processes that have the highest potential to be negotiated first; and (2) minimising the potential for losing business by waiting to reserve inventory until the order has passed all the previous screening steps.

8. So far we haven't considered the impact of this process on the salesperson.

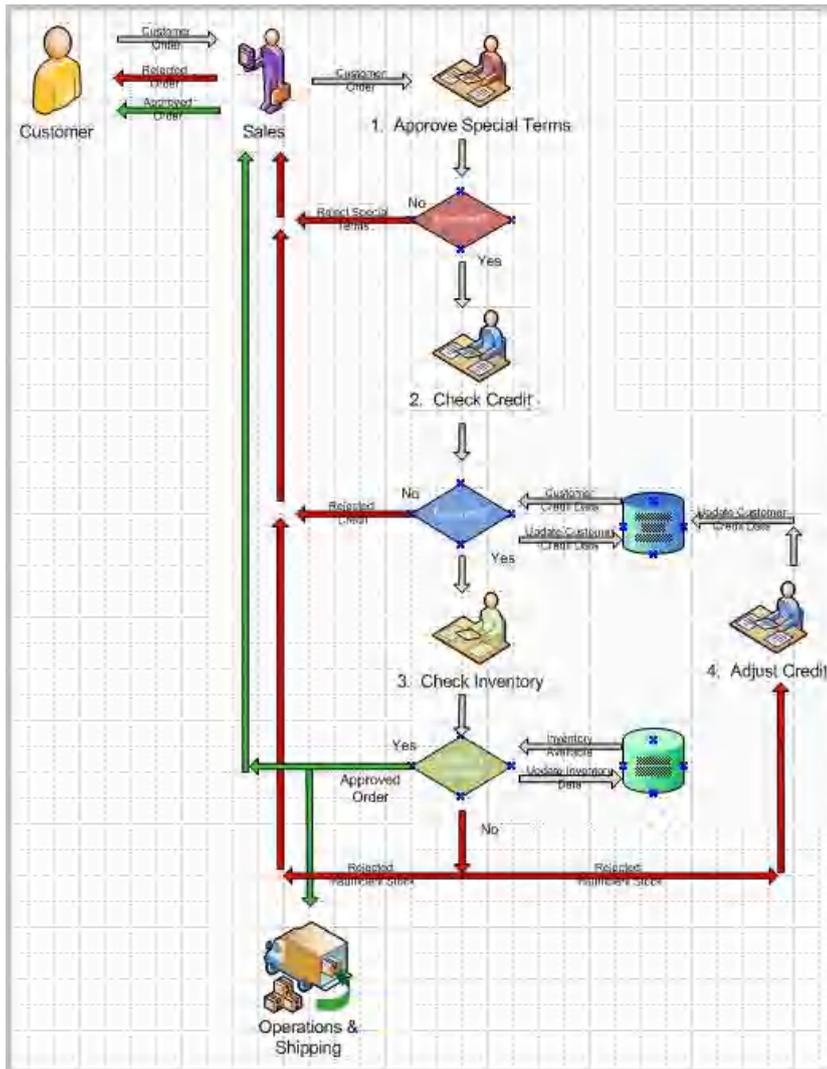
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What information do salespeople need to maintain good relationships with their customers?

The salespeople need to know the reason for order rejection and also should be able to work with the customer on issues that are potentially negotiable. If we cannot meet the requested special terms, the salesperson needs to know which term is problematic. Then perhaps the salesperson can find other terms that are agreeable to the customer. If the customer does not have a sufficient credit line, the salesperson needs to know the amount of credit deficiency. Then, the salesperson can inform the customer of the problem and potentially work to create an order with different financing. The only issue that really is outside the salesperson's control is inventory availability. Even then, if we can inform the salesperson of the expected replenishment date, then perhaps the customer can be persuaded to wait until we can fill the order.

9. Optional extension. *Download the Visio diagram version of Figure 2.5 from this book's website, <www.pearsonhighered.com/kroenke>. Modify the diagram to illustrate the sequence of tasks you chose as best in your answer to Question 6.*

The following diagram illustrates the changes outlined in Question 6, and also incorporates a new adjustment process to modify the customer's credit availability if the order is rejected due to insufficient inventory.



Case study 2—Justicelink system problems

1. As you will learn in Chapter 7, the three types of business process are (1) processes within a single department, (2) processes that span several departments and (3) processes that span different organisations. Which type of process is the court document process at the NSW Department of Justice? Using the NSW Department of Justice as an example, compare and contrast these three process types according to:

- a. size
- b. capability
- c. complexity of process
- d. need for information
- e. management control.

Single-department processes will be the smallest in size; will have more limited capability; will be the least complex; will require the most narrowly focused information; and will be the easiest for management to control. Cross-departmental processes will be larger and will involve more varied

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tasks; will have more capability; will be more varied and complex; will require more diverse information; and will be somewhat more difficult for management to coordinate and control because they span departmental boundaries. Inter-organisational processes will be the largest in size; will have the most capability, but will be the most complex; will require the most diverse information; and will be the most difficult in terms of management control because multiple organisations are involved.

2. Why did the NSW government significantly misunderstand the importance of Justicelink given the impact of the problems? How should organisations determine the relative importance of information technology investments and ensure that the ICT budget properly addresses the strategic imperatives of the organisation?

The *Justicelink* system had problems that became more apparent over time. The main problems were in relationship to the interface with the existing police COPS system. It emerged that the interface was poorly synchronised and that the maintenance of consistent and up-to-date data and information between the two systems was problematic. It is possible that the NSW Department of Justice focused too much on the 'internal' requirements of the court processes and not sufficiently on the interface to COPS and the police processes. The maintenance of data between different inter-organisational systems is a major problem area and the attention required to ensure that the interface is successful should not be underestimated.

3. Read about the SAP business process master list at http://help.sap.com/saphelp_47x200/helpdata/en/cb/89f654c27211d28afa000e828549c/content.htm, then answer the following questions.

a. Why might such an inventory might be necessary?

Having an inventory of business processes is useful to make sure that no business process, however small, is overlooked, and to make sure that every process is properly implemented during what SAP calls the 'Realization' phase. Having such an inventory may have been useful in this case to address the problems of the synchronisation and data consistency between the new *Justicelink* system and the existing police COPS system—these are potentially major problems when developing inter-organisational systems and the attention required to ensure that the interface is successful should not be underestimated. The business process master list would have enabled the appropriate processes to be selected to meet the particular needs of the business.

b. In what ways do you think such an inventory would be valuable? How would it save costs, result in faster implementations and/or create better systems?

This inventory is very valuable because not only does it capture all the relevant business processes for an organisation, it represents 'best practices' for the processes in a given industry—these are standardised and designed to work together and they provide flexibility. The characteristics of the entire court and police processes and their relationship to other business processes

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help determine which processes will be implemented within an information system. This should result in faster development times and better systems.

c. In what ways would such an inventory be of limited value? Would knowledge of a process developed in one context be useful in another?

The inventory of processes may be deficient when dealing with inter-organisational systems. These systems are the most likely to require a custom solution because the systems used in one organisation are likely to be very different to those used in another, even if they are in the same industry. The fact that *Justicelink* was designed to operate across court and police processes means that inter-organisational issues were inherent in the design of the system and this may have limited the usefulness of an inventory of processes; on the other hand, it may have identified possible areas of concern. Also, *Justicelink* is a reasonably unique, custom system and relevant master lists may not be available.

d. In what ways might the development of a business process master list been of use to the NSW government in relation to Justicelink?

See response to part b. A business process master list may have helped the NSW Department of Justice to appreciate the fact that the *Justicelink* system would be very complex and technically challenging because of the volumes of data to be processed and the complexity of inter-organisational business processes. This may have resulted in the NSW Department of Justice giving the *Justicelink* system due regard in terms of priority for funding, resourcing and overall management oversight.