# CHAPTER 2

## Business Processes, Information Systems and Information



THIS COULD HAPPEN TO YOU

Before Kerrie could get very far with her project to create a CRM system for the financial planners, she needed a budget. For that, she needed the approval of her boss. When Kerrie explained the idea to him, he was pleased that she was thinking innovatively and he was positively inclined to support the project. However, he wanted more specifics and told her that before he would approve spending any money, he wanted answers to four questions:

- 'How will this CRM system impact on business processes?'
- 'How will the financial planners use it?'
- 'How will it help us gain business?'
- 'How will it help us make money?'

It was easy for Kerrie to answer these questions because she had worked in a bank and was acquainted with financial processes and the large software systems that support them. Before we consider her responses, however, you need to learn more about business processes and how they relate to information systems.

**AN OPTIONAL EXTENSION**

FOR THIS CHAPTER IS

CE2 Collaborative Information Systems for Student Projects.

## 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?
**Q4** What is information?
**Q5** What data characteristics are necessary for quality information?

**HOW DOES THE KNOWLEDGE IN THIS CHAPTER HELP KERRIE AND YOU?**

## Q1 Why Does $RU Need to Understand Business Processes?

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Kerrie, Murray and the rest of the team at $RU need to understand business processes; even more important than this, they need to know how to improve them. Business professionals must answer questions like:

- Can we change the way we work to better achieve goals?
- Can we do our work with less cost?
- How can we eliminate special cases and exceptions that require additional work?
- Why is it so hard to get something done?
- Why do we have so many forms to fill out?
- Can we improve processes by using information systems?
- Do our information systems need to be changed to more closely fit our processes?

To proceed with the creation of the CRM system for the financial planners, they need to understand $RU's business processes. Kerrie is acquainted with financial processes and large software systems but has limited experience in creating systems such as CRM. When adopting new information systems, a good approach is to study $RU's business processes to identify what is working well and what is working less well, including looking for inefficiencies. For example, $RU has processes for obtaining new clients, for scheduling meetings and for providing financial advice. Can any of these processes be simplified? Can tasks be reordered or reorganised to eliminate some tasks and make the processes more efficient? And, finally, can $RU reduce process costs by applying information technology?

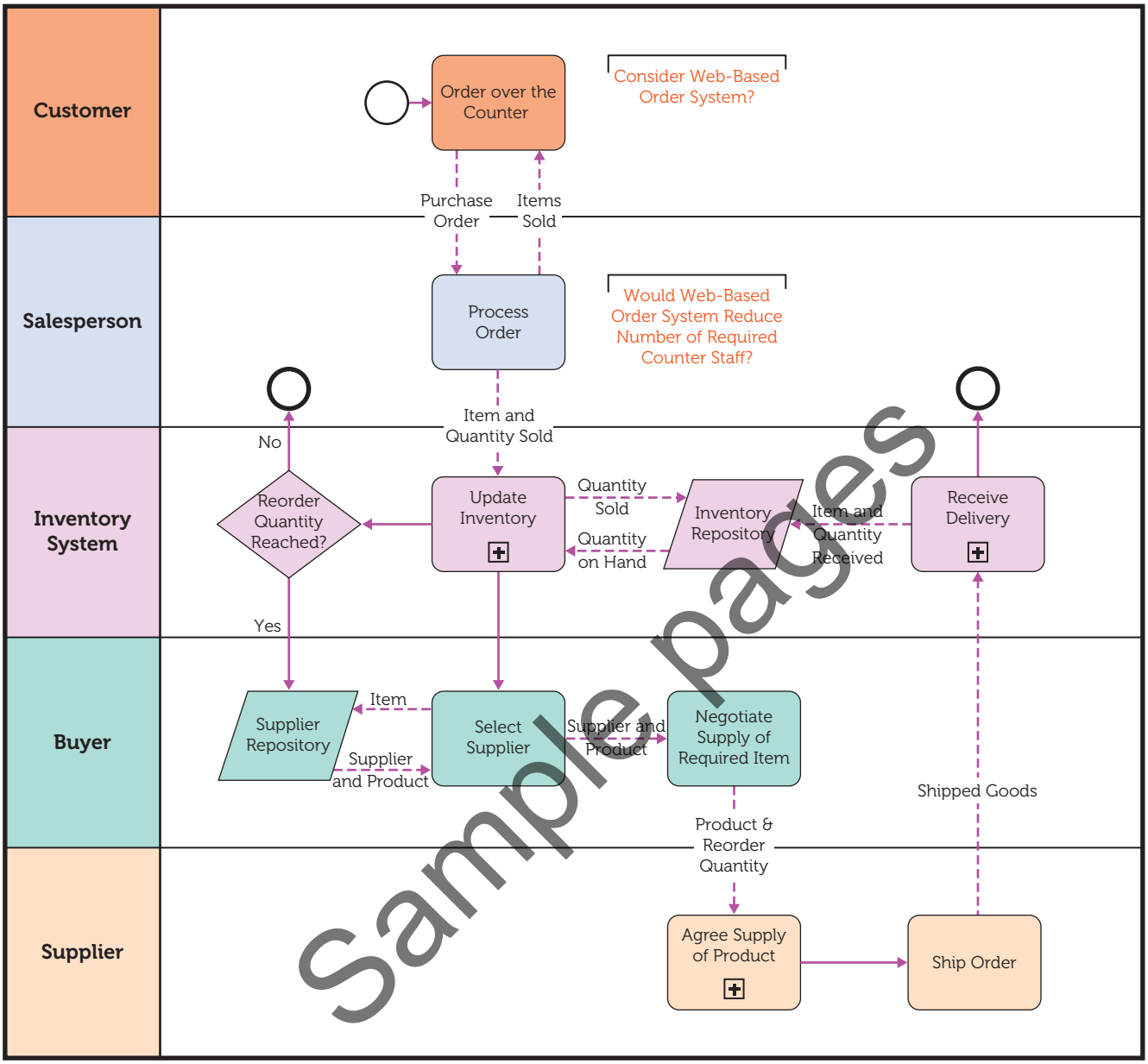
An information system such as CRM is more likely to fail if business processes haven't been understood and optimised before the system is implemented. We shall examine this possibility later in this chapter and in other similar examples throughout this book.

**In all meetings, it is important to remember that not everyone holds the same viewpoint as you. Depending upon your actions in these situations, ethical challenges can arise. The *Ethics Guides* throughout this book illustrate some of these issues.**

## Q2 How Can Business Process Modelling Help Organisations?

A **business process** is a network of activities for accomplishing a business function. Figure 2.1 shows a model of a portion of a simplified inventory management business process (for example, there is no business process for payment!)—simplified because a real-world inventory management business process would be more complex and would be modelled in greater detail (this simplified model is sufficient to illustrate business process modelling). This model, or an abstraction, is constructed using the symbols of **business process modelling notation** or

**Figure 2.1** Portion of Inventory Management Business Process






BPMN. This notation is an international standard for creating business process diagrams.[1] A key to these symbols is shown in Figure 2.2.

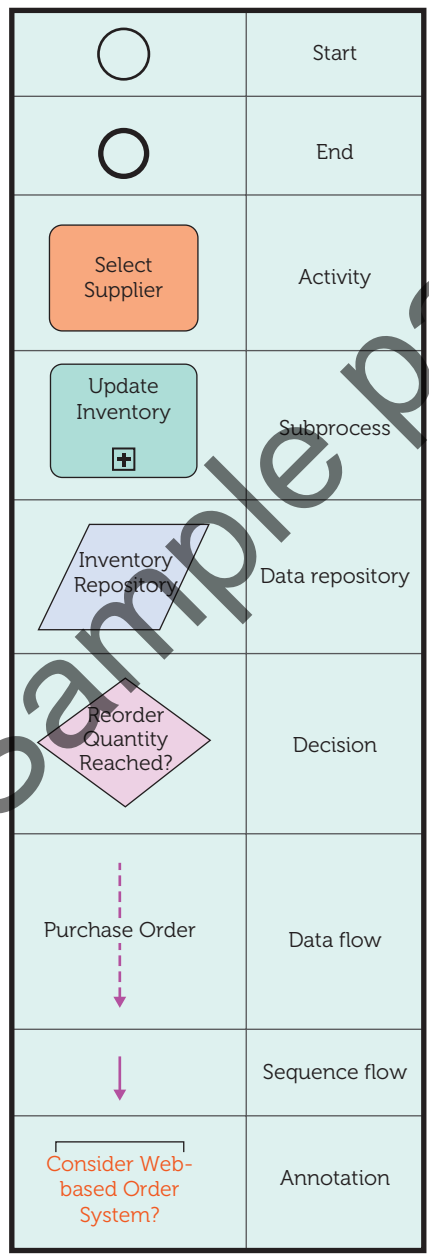
Figure 2.1 is organised in what is called **swim-lane format**, which is a graphical arrangement in which all of the activities for a given role are shown in a single horizontal or vertical lane. Each swim lane has **activities**, which are specific tasks that need to be accomplished as part of the process. A **role** is a subset of the activities in a business process that is performed by an actor, which is a person, group, department, organisation, or information system. Figure 2.1 shows the roles of Customer, Salesperson, Inventory System, Buyer and Supplier.

1 These symbols are included with Microsoft's Visio 2013 Professional edition. If your university is a member of Microsoft DreamSpark you can obtain a licence-free copy of Visio and use it to make your own BPMN diagrams.

According to the BPMN standard, the start of a business process is symbolised by a circle having a narrow border. The end of a business process is symbolised by a circle having a thick border. So, in Figure 2.1, the process starts with the Customer role, or we can also say that a Customer starts the process.

Activities within a business process are shown in rectangles. The first activity for the buyer role is *Select Supplier*. According to this diagram, buyers obtain supplier and product data from the *Supplier Data Repository*. A **repository** is a collection of data that is stored within the business process. Repositories can be computer databases, or they can be collections of files in

**Figure 2.2** Process Symbols (BPMN Standard)




**Source:** Process Symbols (BPMN Standard) are registered trademarks of Object Management Group, Inc. in the United States and/or other countries.

the cloud (think 'on the internet' for now), or they can be printed records stored in a filing cabinet or a shoebox. For the purpose of documenting a business process, the particular medium in which repository data is stored is unimportant. The *Supplier Data Repository* contains not only data from prior purchases but also the results of supplier sales calls, supplier mailings, prior buyer searches of supplier and product data on the internet, and so forth.

The labelled dashed lines in Figure 2.1 are called **data flows**. They represent the movement of data from one activity to another. The data can be delivered via email or text message, over the phone, by fax or by some other means. In a BPMN diagram, the medium of data delivery is also unimportant. For the level of our discussion, the format of the data item is also not important.

The solid line between the activities *Agree Supply of Product* and *Ship Order* means that after the supplier has agreed with the buyer to provide the product, the supplier's next action is to perform the *Ship Order* activity. Such solid lines are called **sequence flows**.

The final BPMN symbol used in Figure 2.1 is an activity with a boxed plus sign inside it. This notation indicates a subprocess and is used when the work to be done is sufficiently complex as to require a process diagram of its own. In Figure 2.1, the *Update Inventory* activity involves many activities and several different roles. In the complete set of process documentation, it would have a BPMN diagram of its own. Here we will not be concerned with those details.

With the understanding of these symbols, you can interpret the rest of Figure 2.1 on your own.

To summarise, a business process is a network of activities. Each activity is performed by a role. Roles are taken by people, groups, departments and organisations. Repositories are collections of data. Data flows between activities; when one activity follows directly after another, the flow is shown with a sequence flow. Complex activities are represented by a separate diagram and denoted by a boxed plus sign in the activity. Every business, including $RU, has dozens of processes. Any organisation can be modelled as a complex maze of interacting business processes. The BPMN model in Figure 2.1 then provides a basis for discussions with others—it can be used to document where the existing processes need to be altered, to determine which processes should be automated, and also to demonstrate the need for additional personnel.



## Q3 How Can Information Systems Improve Process Quality?

Information systems benefit business processes in many ways. For our purposes, the most succinct summary is to say that information systems improve process quality. To understand why that is so, you first need to understand process quality.

### What Is Process Quality?

Process quality can be measured in two dimensions: process effectiveness and process efficiency. An **effective business process** is one that enables the organisation to accomplish its strategy. The second dimension of process quality is efficiency. **Efficiency** is the ratio of benefits to costs. Consider two versions of a business process for accomplishing some function. If both versions create the same benefit, but one costs more than the other does, then the higher-cost version is less efficient than the lower-cost version. Or if both versions cost the same, but one generates less benefit than the other, then the lower-benefit one is less efficient.

By the way, if you look at the business processes in Figure 2.1, you won't see any costs, not directly anyway. So, where are they? One major source of cost is the labour of employees who perform the activities. If it takes someone 10 hours to perform an activity, then the cost of that

activity is the cost of those 10 labour hours. Behind the scenes, there are also infrastructure costs. Data doesn't just flow automatically from one activity to another. Some type of computer network, email or other system needs to exist to support those data flows. The cost of that infrastructure is part of the costs of the business process.

## Using Information Systems to Improve Process Quality

To understand how information systems improve process quality, consider Figure 2.3, which shows the five components of an information system. Notice the symmetry of these components; the outermost components, hardware and people, are both actors—they take action. The software and procedure components are both sets of instructions. Software is instructions for hardware, and procedures are instructions for people. Finally, data is the bridge between the computer side on the left and the human side on the right.

When an activity in a business process is automated, activities formerly done by people following procedures are moved to computers that perform the work by following instructions in software. Thus, the automation of a process activity consists of moving work from the right-hand side of Figure 2.3 to the left.

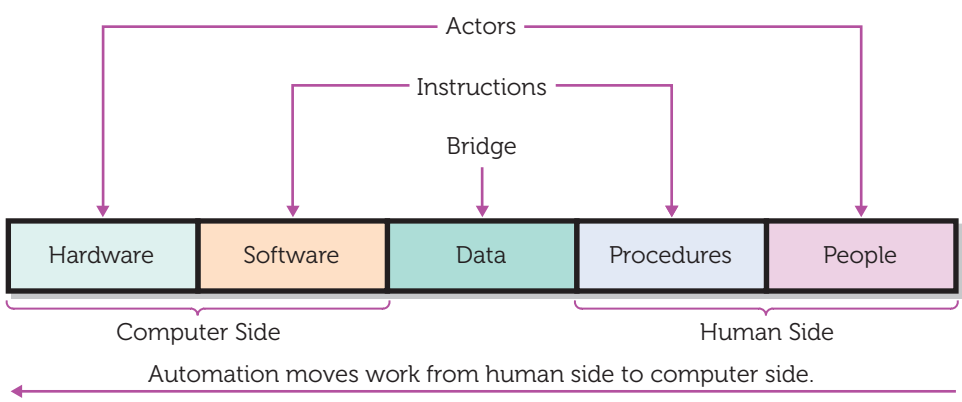
To understand this, consider the *Select Supplier* activity in Figure 2.1. That process could be entirely manual. The buyer could use the internet (for this example, ignore the fact that she is using a computer system to access the internet), gather data about suppliers and products, make analyses of costs and margins by hand, and store the results of those analyses on paper in a file folder in her desk. When she wants to access past records for a particular vendor, she would manually search through her desk to find those records.

One way to use information systems in this process would be for buyers to store the results of vendor analyses in an Excel file. If this were done, the buyer would have a faster and more reliable means of finding relevant data. The time required to perform the analysis and locate past analyses would be reduced, the cost of the process would decrease, the process would be more efficient, and hence process quality would increase.

For another example, suppose the *Supplier Data Repository* is implemented as a computer database that combines both product specifications as well as supplier performance data. Now buyers cannot only use their own data about suppliers and products, but they also can view past supplier performance data to choose between suppliers when products are available from several suppliers. A process that uses such an information system saves buyer labour and, on the surface,



**Figure 2.3** Characteristics of the Five Components



is more efficient. But such an information system will cost something to develop and operate. Those costs must also be considered before an organisation can decide if making such a change makes the process more efficient. By the way, you can see from this simple example why it is vital that business professionals be involved in the development of information systems. If systems development is left solely to technical personnel, they may develop a system that is technically elegant but with costs that cannot be justified.

In addition to improving process efficiency, information systems can also improve process effectiveness. If the buyers, for example, share supplier data, they may be able to identify new products to stock or find another supplier to provide particular products—the information system that provides this information to buyers makes the buying process more effective.

Before we close this chapter, you need to understand the factors that lead to quality information; to do that, you first need to understand the difference between information and data. We discuss that topic next.



## EXPERIENCING MIS INCLASS 2
## CatchoftheDay

CatchoftheDay (**<www.catchoftheday.com.au>**) is a website that offers a featured item for sale each day. Starting at noon (Eastern Australian Standard Time), a featured item is posted for sale at a deep discount. When the inventory of that item is gone, the selling stops. The next day CatchoftheDay offers a different product.

### InClass Group Exercise

1. Go to **<www.catchoftheday.com.au>** and click around the site. See what today's item is. Click 'About us' and read the Interesting facts and figures. Discuss the site with your team and, as a team, write a one-paragraph summary of this business. Ignore sister sites such as Scoopon and GroceryRun that offer more specialised services.
2. Identify five business processes that CatchoftheDay needs to run this site. Name the processes and briefly describe them. Select processes that are critical to the operation of the site (avoid generic processes such as Careers).
3. CatchoftheDay's business model is considerably simpler than the typical online retailer's. Name and describe three business processes that typical online retailers need that CatchoftheDay avoids.
4. Develop a diagram of the key processes involved in each day's sales. Use the same level of detail as in Figure 2.1.
5. Describe (in generic terms) the contents of what you think is the most important repository in your answer in Question 4.
6. List five types of information that CatchoftheDay can obtain from the repository in your answer to Question 5.
7. Present your business process (from Question 4) and your answers to Questions 5 and 6 to the rest of the class.

## Q4 What Is Information?

So far, we have been using the terms 'data' and 'information' rather loosely. Before we go further, it is important to explore the meaning of these terms and the relationship between them.

'Information' is one of those fundamental terms that we use every day, but which turns out to be surprisingly difficult to define. Defining *information* is like defining words like *alive* and *truth*. We know what those words mean, we use them with each other without confusion but the terms are nonetheless difficult to define.[2]

**Information is used for transaction processing, day-to-day management and strategic decision-making.**

In this book, we will avoid the technical issues of defining *information* and will use common, intuitive definitions instead. Probably the most common definition is that **information** is *knowledge derived from data*, where *data* is defined as recorded facts or figures. Thus, the facts that employee James Smith earns $17.50 per hour and that Mary Jones earns $25.00 per hour are *data*. The statement that the average hourly wage of all employees in the Garden Department is $22.37 per hour is *information*. Average wage is knowledge that is derived from the data of individual wages.

Another common definition is that *information* is *data presented in a meaningful context*. The fact that Jeff Parks earns $10.00 per hour is *data*.[3] The statement that Jeff Parks earns less than half the average hourly wage of the Garden Department, however, is *information*. It is *data* presented in a meaningful context.

Another definition of information that you will hear is that information is processed data or, sometimes, information is data processed by summing, ordering, averaging, grouping, comparing or other similar operations. The fundamental idea of this definition is that we do something to data to produce information.

A fourth definition of *information* was coined by the well-known psychologist Gregory Bateson: information is a difference that makes a difference. By this definition, there are many differences, but only those that make a difference qualify as information. This definition is informative and useful. It 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?' So, this definition is useful and helpful.

**The *Guide* on pages 32–33 further illustrates the definition of *information* as 'a difference that makes a difference'.**

For the purposes of this book, any of these definitions of *information* will do. Choose the definition of *information* that makes sense to you. The important point is that you can discriminate between *data* and *information*. You also may find that different definitions work better in different situations.



## Q5 What Data Characteristics Are Necessary for Quality Information?

You have just learned that humans conceive information from data. As stated, the quality of the information that you can create depends, in part, on your thinking skills. It also depends, however, on the quality of the data that you are given. Figure 2.4 summarises critical data characteristics.

**Figure 2.4**
Characteristics of Good Information

- Accurate
- Timely
- Relevant
  - to context
  - to subject
- Just sufficient
- Worth its cost

2 For a fascinating discussion of the meanings of the word 'information', see E. H. McKinney & C. J. Yoo 2010, 'Information about Information: A Taxonomy of Views', *MIS Quarterly*, vol. 34, no. 2, June, pp. 329–344. As you will learn there, understanding what we mean by 'information' leads to profound philosophical questions. Dig in and have fun!

3 Actually, the word 'data' is plural; to be correct, we should use the singular form datum and say, 'The fact that Jeff Parks earns $10.00 per hour is a datum.' The word 'datum', however, sounds pedantic and fussy, and we will avoid it in this book.

# GUIDE

## Understanding Perspectives and Points of View

Every human being speaks and acts from the perspective of a personal point of view. Everything we say or do is based on—or biased by—that point of view. Thus, everything you read in any textbook, including this one, is biased by the authors' point of view. Authors may think that they are writing unbiased accounts of neutral subject material. But no one can write an unbiased account of anything, because we all write from a particular perspective.

Similarly, your lecturers speak to you from their points of view. They have experience, goals, objectives, hopes and fears, and, like all of us, they use those elements to provide a framework from which they think and speak.

Sometimes, when you read or hear an editorial or opinion-oriented material, it is easy to recognise a strongly held point of view. It doesn't surprise you to think that such opinions might contain personal biases. But what about statements that don't appear to be opinions? For example, consider the following definition of information: 'Information is a difference that makes a difference.' By this definition, there are many differences, but only those that make a difference qualify as information.

This definition is obviously not an opinion, but it nevertheless was written from a biased perspective. The perspective is just less evident because the statement appears as a definition, not an opinion. But, in fact, it



is the definition of information in the opinion of the well-known psychologist Gregory Bateson.

The authors find his definition informative and useful. It is imprecise, but it is a pretty good guideline, and we have used it to advantage when designing reports and queries for end users. We ask, 'Does this report show people a difference that makes a difference to them?' So, we find it to be a useful and helpful definition.

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.'

And they are right, but so are we, and so was Gregory Bateson. The difference is a matter of perspective and, surprisingly, conflicting perspectives can all be true at the same time.

One last point: Whether it is apparent or not, authors write and lecturers teach not only from personal perspectives but also with personal goals. We write this book in the hope that you will find the material useful and important and that you will tell your lecturer that it is a great book so that he or she will use it again. Whether you (or we) are aware of that fact, it and our other hopes and goals bias every sentence in this book.

Similarly, your lecturers have hopes and goals that influence what and how they teach. They may want to see light bulbs of recognition on your face, they may want to win the 'Lecturer of the Year' award, or they may want to gain tenure status in order to be able to do some advanced research in the field. Whatever the case, they, too, have hopes and goals that bias everything they say.

So, as you read this book and as you listen to your lecturer, ask yourself: 'What is her perspective?' and 'What are his goals?' Then compare those perspectives and goals to your own. Learn to do this not just with your textbooks and your lecturers, but with your colleagues as well. When you enter the business world, being able to discern and adapt to the perspectives and goals of those with whom you work will make you much more effective.

## DISCUSSION QUESTIONS

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?
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?
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?
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 in 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?
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?

## Accurate

First, good information is **accurate information**. Good information is based on correct and complete data which has been processed correctly as expected. Accuracy is crucial; business professionals must be able to rely on the results of their information systems. The IS function can develop a bad reputation in the organisation if a system is known to produce inaccurate information. In such a case, the information system becomes a waste of time and money as users develop workarounds to avoid the inaccurate data.

A corollary to this discussion is that you, a future user of information systems, ought not to rely on information just because it appears in the context of a website, a well-formatted report or a fancy query. It is sometimes hard to be sceptical of information delivered with beautiful, active graphics. Don't be misled! When you begin to use an information system, be sceptical. Cross-check the information you are receiving. After weeks or months of using a system, you may relax. But you should begin with scepticism. Again, you cannot conceive accurate information from inaccurate data.

## Timely

Good information is **timely information**—produced in time for its intended use. A monthly report that arrives six weeks late is most likely useless. The information arrives long after the decisions that needed that information have been made. An information system that tells you not to extend credit to a customer after you have shipped the goods is unhelpful and frustrating. Notice that timeliness can be measured against a calendar (six weeks late) or against events (before we ship).

When you participate in the development of an information system, timeliness will be part of the requirements you will request. You need to give appropriate and realistic timeliness needs. In some cases, developing systems that provide information in near real time is much more difficult and expensive than producing information a few hours later. If you can get by with information that is a few hours old, say so during the requirements specification phase.

Consider an example. Suppose you work in marketing and you need to be able to assess the effectiveness of new online ad programs. You want an information system that won't only deliver ads on the web, but one that will also enable you to determine how frequently customers click on those ads. Determining click ratios in near real time will be very expensive; saving the data in a batch and processing it every few hours will be much easier and cheaper. If you can live with information that is a day or two old, the system will be easier and cheaper to implement.



## Relevant

Information should be **relevant** both to the context and to the subject. If you were a CEO, you would need information that is summarised to an appropriate level for your job. A list of the hourly wage of every employee in the company is unlikely to be useful. More likely, you would need average wage information by grouped department or division. A list of all employee wages is irrelevant in your context.

Information should also be relevant to the subject at hand. If you want information about short-term interest rates for a possible line of credit, then a report that shows 15-year mortgage interest rates is irrelevant. Similarly, a report that buries the information you need in pages and pages of results is also irrelevant to your purposes.

## Just Barely Sufficient

Information needs to be **just barely sufficient** for the purpose for which it is generated. We live in an information age; one of the critical decisions that each of us has to make each day is what

information to ignore. The higher you rise in management, the more information you will be given and, because there is only so much time, the more information you will need to ignore. So information should be sufficient, but just barely so.

## Worth Its Cost

Information isn't free. There are costs for developing an information system, costs for operating and maintaining that system, and costs of your time and salary for reading and processing the information the system produces. For information to be **worth its cost**, an appropriate relationship must exist between the cost of information and its value.

Consider an example. What is the value of a daily report of the names of the occupants of a full graveyard? Zero, unless grave robbery is a problem for the cemetery. The report isn't worth the time required to read it. It is easy to see the importance of information economics from this silly example. It will be more difficult, however, when someone proposes some new system to you. You need to be ready to ask, 'What is the value of the information?' or 'What is the cost?' or 'Is there an appropriate relationship between value and cost?' Information systems should be subject to the same financial analyses to which other assets are subjected.



**HOW DOES THE KNOWLEDGE IN THIS CHAPTER HELP KERRIE AND YOU?**

**Kerrie needs to obtain a budget from her boss for the CRM system.** When she asked him about the project, he wanted answers to the following four questions:

- 'How will this CRM system impact our business processes?'
- 'How will the financial planners use it?'
- 'How will it help us gain business?'
- 'How will it help us make money?'

Kerrie can use the knowledge from this chapter to shape her responses. To answer the first question, she needs a diagram of the business process in a format such as that in Figure 2.1. The diagram will show the financial planners, the investors and clients, and the various stages of the business processes. It also needs to show information that the 'financial planners' need during these processes.

To answer the second question, Kerrie can add the CRM system as a facility that the financial planners can access. She would then amend the first diagram to show how the information would be accessed.

Kerrie can structure her answer to the third and fourth questions using Bateson's definition of information: 'a difference that makes a difference'. For example, she can use the CRM system to communicate changes to financial planning products. When she does that, she will be communicating a difference (a new or changed financial planning product) that makes a difference. (It is now available!) She can also communicate other information (differences that make a difference) from herself, from financial planners, and from investors and clients.

Her boss didn't ask for it, and it probably is beyond what Kerrie wants to do at this point, but she could also create diagrams like Figures 2.1 and 2.5. In one figure, she could summarise the five components of the information system that the planners will use when they access the CRM system. In another figure, she could summarise the five components of the information system she will use when she (or someone else) updates the CRM system.

# GREEN IT GUIDE

## 'Whole-of-Government' Approach To Green IT

The Australian Government ICT Sustainability Plan 2010–2015 aims to assist the federal government in utilising information and communications technology (ICT) resources more effectively, improve efficiency, increase productivity, and reduce the environmental impact of ICT by focusing on the responsible acquisition, installation, maintenance, use and disposal of ICT. The plan identifies standards to be applied in government purchasing of ICT products and services, as well as introducing measures to improve the environmental performance of ICT, particularly in terms of energy efficiency.

Section 2 of the plan introduces six mandatory environmental standards into ICT procurement processes to establish minimum levels of environmental performance for relevant ICT acquisitions and to signal to suppliers and manufacturers the Australian government's intentions for improved ICT sustainability practices.

Australian government agencies currently manage considerable quantities of ICT equipment, estimated at 350 000 personal computers and laptops, 14 000 servers and 37 500 imaging devices, as well as consuming an estimated 6500 tonnes/year of office copy paper for internal printing. The six mandatory environmental standards are:

1. *ICT equipment environmental standards*
   This standard introduces product standards and eco-labels, based on a life-cycle approach, which aim to assure that environmental issues arising from the design, manufacture, distribution, packaging, use and disposal of ICT products have been taken into consideration. While some agencies are already using the Electronic Product Environmental Assessment Tool (EPEAT®), this standard mandates such products across whole-of-government, ensuring that ICT equipment procured by agencies meets minimum environmental performance criteria. This standard also aims to encourage manufacturers and suppliers to invest in, develop, produce and supply more environmentally sustainable ICT goods and services.
2. *ICT equipment and ENERGY STAR®*
   This standard aims to assure that energy consumption, carbon pollution and



running costs associated with a product's use phase are minimised. While a number of agencies are already using ICT equipment with the latest version of ENERGY STAR®, this standard mandates the purchasing across whole-of-government which will improve energy, carbon and financial performance for the government as a whole.

3. *Product take-back, reuse and resource recovery*
   This standard aims to assure that a product's end-of-life impact on the environment is being managed and minimised. The appropriate reuse or resource recovery strategies apply to: (a) mobile devices, such as mobile phones, PDAs and smartphone devices; (b) toner cartridges; and (c) ICT equipment covered by the National Television and Computer Product Stewardship Scheme under the *National Waste Policy* (NWP).

4. *Recycled content office copy paper*
   This standard requires government agencies to use 'post-consumer' recycled content paper (manufactured from discarded materials such as newspapers, office paper, magazines and packaging) for general use copying and printing. General use office copy paper is to have a minimum post-consumer recycled content of 50 per cent by July 2011 (committed when the plan was adopted) with progression to 100 per cent by July 2015. Agencies are also required to introduce similar paper content standards for external printing and design contracts, where possible.

5. *Used packaging requirements*
   This standard aims to assure that suppliers will reduce the environmental impact of consumer packaging through improved design and production processes, and the reuse and recycling of used packaging materials.

   Although a number of suppliers have already adopted the Australian Packaging Covenant or comply with the National Environment Protection (Used Packaging Materials) Measure (NEPM), this standard mandates this procurement requirement across the whole-of-government.

6. *ICT suppliers and environmental management*
   Agencies are required to ensure that ICT suppliers meet one of the following options at the completion of contract negotiations. The supplier:
   a. has an environmental management system (EMS) certified to ISO 14001, or
   b. has an EMS aligned to ISO 14001, or
   c. agrees to align business processes to the ISO 14001 standard within six months of contract signing if they don't have an aligned/certified EMS and are successful in securing a contract.

   Suppliers must maintain EMS certification or alignment to ISO 14001 for the duration of the contract.

**Source:** Australian Government ICT Sustainability Plan 2010-2015, Department of Environment, Commonwealth of Australia 2013.



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

# ACTIVE REVIEW

Use this Active Review to verify that you understand the ideas and concepts that answer the chapter's study questions.

**Q1 Why does $RU need to understand business processes?** Summarise the reasons why the $RU team needs to understand business processes. Explain how process abstractions make the $RU team more effective. Explain why knowledge of the role of information systems is also important.

**Q2 How can business process modelling help organisations?** Summarise $RU's business operations. Define *business process* and give three examples. Define *BPMN*, *swim-lane format*, *activity*, *role*, *actor*, *repository*, *data flow*, *sequence flow* and *subprocess*. Describe the BPMN symbols used for each. Review Figure 2.1 and ensure you can explain how this business process works.

**Q3 How can information systems improve process quality?** Define two dimensions of *process quality*. Explain how information systems can improve both of these dimensions. Summarise the ways that information systems can improve the process quality of the processes in Figure 2.1. Explain how automation relates to the five components in Figure 2.3.

**Q4 What is information?** Give four definitions of information. Using your own experience and judgment, rank those definitions in order of usefulness in business. Justify your ranking. Describe where both data and information are located.

**Q5 What data characteristics are necessary for quality information?** Name and describe five data characteristics that are needed to produce quality information. Explain why each is required.

**HOW DOES THE KNOWLEDGE IN THIS CHAPTER HELP KERRIE AND YOU?**

**Summarise the ways in which Kerrie will use the knowledge in this chapter to answer the four questions her boss asked her. What do you think of this strategy? Is it likely to satisfy her boss? Can you think of other ways of responding to these questions that would be more effective?**




# KEY TERMS AND CONCEPTS

Activities 26
Accurate information 34
Business process 25
Business process modelling notation (BPMN) 25
Data flows 28
Effective business process 28
Efficiency 28
Information 31
Just barely sufficient information 34
Relevant information 34
Repository 27
Role 26
Sequence flows 28
Swim-lane format 26
Timely information 34

# 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 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?

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

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?

d. Give your own best definition of information.

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'.

**2.** Suppose you manage the buyers in your organisation and that 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
b. the number of employees you will need
c. your criteria for hiring employees
d. your management practices
e. the degree of autonomy for your employees
f. your flexibility in managing your department.

**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.

## COLLABORATION EXERCISE 2

Read Chapter Extensions 1 and 2 if you have not already done so. Meet with your team and build a collaboration IS that uses tools like Google Docs, SharePoint, or other collaboration tools. Do not forget the need for procedures and team training. Now, using that IS, answer the questions below.

Many students, especially those with limited business experience, have difficulty understanding how important business processes are and how complex even simple processes can become. The following business situation and exercises will help you understand the need for business processes, the importance of process design, and the role that information systems play in support of such processes.

Suppose you work for a supplier of electric and plumbing supplies, equipment and tools. Your customers are home builders and construction companies that are accustomed to buying on credit. When you receive an order, you need to evaluate it and approve any special terms before you start removing items from inventory and packaging them for shipment. Accordingly, you have developed the order-approval process shown in Figure 2.5.

As you can see, your order-approval process consists of three stages: Check Credit, Check Inventory and Approve Special Terms. You check credit and inventory on every order, but you need to approve special terms only if the customer asks for something special, such as free shipping, an extra discount, or unusually fast service and delivery.

Even a business process this simple has unexpected complexity. For one, are the checks in the proper order? This business process checks inventory before it checks credit. Does it make sense to check inventory before you check credit? Would checking credit first make more sense? And, if it turns out that you are going to reject the special terms of an order, would it make sense to check them first, before evaluating inventory and credit?

Notice that if sufficient inventory does exist, the needed inventory is allocated to that order. But, if the customer's credit or special terms are rejected, that inventory is not released. In that case, you or one of your employees will need to remember to free the allocated inventory.

We can't tell this from Figure 2.5, but if customer credit is increased if credit checking is approved, then a similar comment pertains to credit. If special terms are not approved, the allocated credit needs to be returned to the customer somehow.

Other problems occur because you are most likely processing many orders at the same time. Suppose two orders include one Kohler Supreme kitchen sink, but you have just one in inventory. You want to sell the sink to the first customer but that means you must allocate that sink to it. Otherwise, both orders will be processed for the same sink. But suppose that the special terms of the order to which you've allocated the sink are not approved. You would like to reassign the sink to the second order if it is still around to be processed. How can you accomplish that?

This scenario ignores another possibility. Suppose you have two order requests for the same sink; one is from a retail customer who wants it for her mountain home, and the second is from Big Sky Construction, a customer that buys 500 sinks a year from you. To which customer do you want to allocate that single sink? And how do you know how to do that?

Working with your team, answer the following questions.

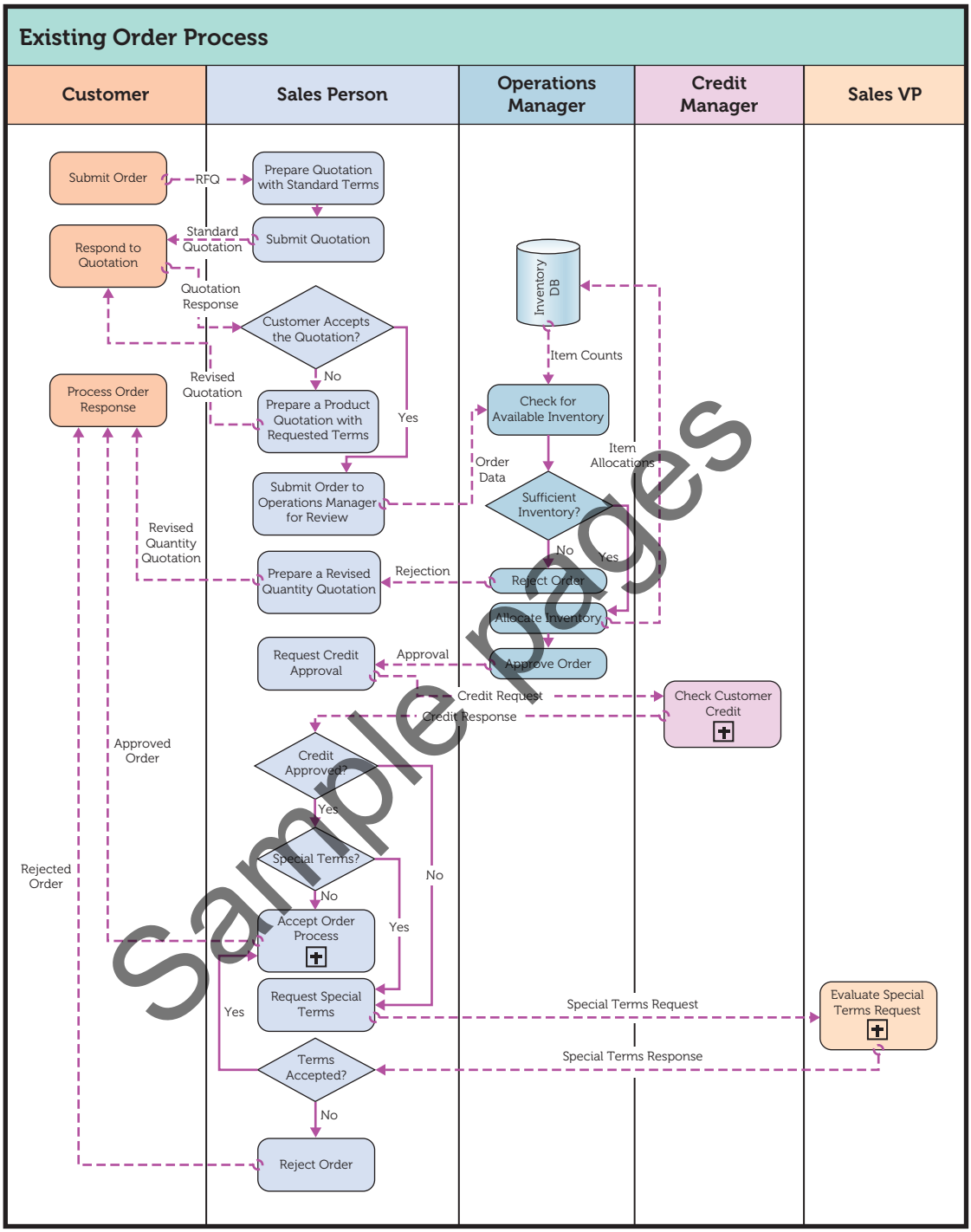
**1.** In Figure 2.5, explain why inventory must be allocated.

**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?

**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.

**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 adjustment and how they obtain the data for doing so.

**Figure 2.5** Existing Order 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.
6. Evaluate each of the three sequences that you selected in Question 5. Identify which sequence you think is best.
7. State the criteria that you used for making your selections in Questions 5 and 6.
8. So far, we haven't considered the impact of this process on the salesperson. What information do salespeople need to maintain good relationships with their customers?

**9.** *Optional extension.* Download the Visio diagram version of Figure 2.5 from this book's website, **<www.pearson.com.au/9781486019281>**. Modify the diagram to illustrate the sequence of tasks you chose as best in your answer to Question 6.

## CASE STUDY 2

# Justicelink System Problems

The NSW state government's Department of Justice implemented the $54.5 million *Justicelink* system in July 2009.[4] The aim of the system was to reduce costs and speed up processing in the courts by linking all the NSW courts and allowing court documents to be lodged and exchanged electronically. *Justicelink* also provides regular updates to the NSW Police system, COPS, to ensure that police records reflect the latest decisions taken in the courts.

By October 2009, three months after implementation, problems in dealing with Apprehended Violence Orders (AVOs), breaches of bail conditions, warrants and criminal records were identified and hadn't been fully resolved over a year later. Problems included failing to update AVOs to the COPS system, insufficient information on warrants, incorrect dates and missing charges on court records, and problems with formatting court lists.

A specific problem, still unresolved in March 2012, is that *Justicelink* doesn't properly synchronise with the COPS system, meaning that police don't have immediate and up-to-date access to the changes in court records following a court decision.[5] As a result, they may make wrongful arrests despite acting in good faith on the basis of information available to them. Typical examples are:

- A 19-year-old was arrested, strip-searched and spent a night in jail because the COPS system didn't record that all charges against him had been dismissed in a Children's Court decision four days before the arrest.
- A 17-year-old was arrested and detained overnight for breaking bail conditions, even though he had complied with revised conditions, put into effect by a magistrate a month earlier, that extended his curfew to 9 pm.

As a result, 21 children are now joining in a class action against the NSW state government because they believe they were wrongfully arrested as a result of the problems with the system. The number joining the action continues to grow, and could reach 200. In the 2011 financial year, NSW Police were required to pay more than $5 million in compensation for false imprisonment and assault (an increase from $4 million in 2010).

## QUESTIONS

**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.

**2.** Why did the NSW government 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?

**3.** Read about the SAP business process master list at **<http://help.sap.com/saphelp_47x200/helpdata/en/cb/89f654c27211d28afa0000e828549c/content.htm>**, then answer the following questions.

a. Why might such an inventory be necessary?
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?
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?
d. In what ways might the development of a business process master list have been of use to the NSW government in relation to *Justicelink*?

4 D. Jopson 2011, 'Police force damaged by computer errors', *Sydney Morning Herald*, 9 June.
5 N. Ralston 2012, 'Children sue over arrest flaw', *Sydney Morning Herald*, 25 March.