

White Paper

Understanding Business Processes and Data Simultaneously

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So often when I train business analysis professionals I am told “we do not look at data during requirements gathering because it is the responsibility of IT”. Is this thinking common?

Business Analysis practitioners must have a holistic view of the organization’s elements and must be able to determine which types of models are required to document (model) requirements views from different perspectives that includes behaviour (how work flows), structure (data needed to support the work flow), dynamics (triggers work to begin) and control (the business rules that control organization behaviour). Whenever single dimension views are taken there is a high risk of poor requirements. Asking business stakeholders to detail the information needed to support a business process is an excellent technique that helps the analyst to understand the business from another perspective and it allows the business to drive system design and not the other way around. By identifying and detailing data in a model, further requirements and problem areas will arise and can be dealt with long before software design.

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TIP: *Business Analysts must have a good knowledge of all the business analysis dimensions and should not focus on one area alone. Focusing on one area alone is like trying to sit on a one legged stool – you will be on the floor before you know it.” [Scott Ambler]*

Regardless of what methodology or techniques used, it is important to understand that a balanced perspective of the requirements is needed through the lens of the 4 fundamental model views.”

[Mary Gorman, EBG Consulting, USA]

There are many techniques and tools available for Business Analysts to use. These include graphical, textual and matrix style modelling and documentation. A good Business Analyst must be capable of working with more than one technique (and presenting different dimensional views) when communicating requirements and usually a good Business Analyst may use a combination of models in parallel of each other and which are related to each other. For example, when I work on an initiative (be it at EA or Project level), I always begin by using a Context Diagram to understand the organisation and the external entities that trigger inputs and receive outputs from the organisation. By working with stakeholders, I very quickly understand the organisation or Business Unit under discussion.

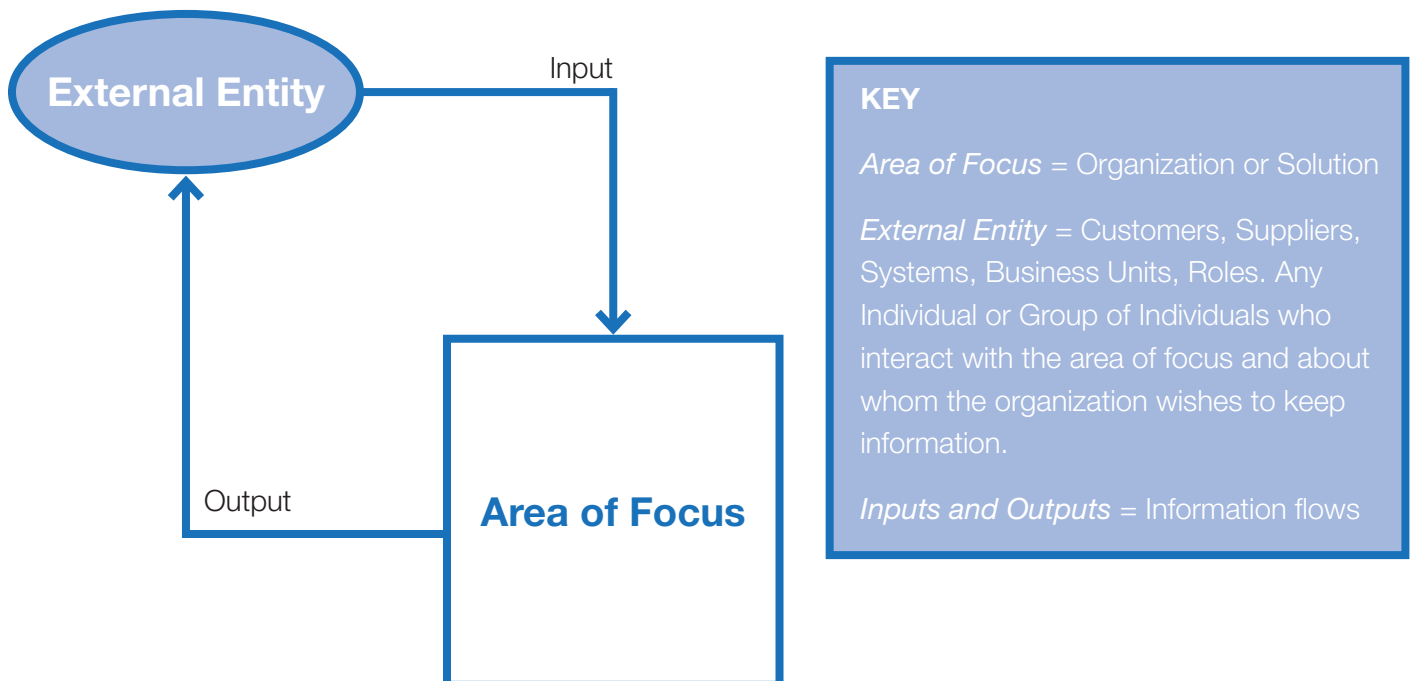


Figure 1: Context Diagram - Example 1

Models are not hierarchical and can be used at any level of abstraction or to describe different perspectives. Therefore I also use the Context Diagram technique as a starting point to understand the inputs and outputs of a solution. The Context Diagram is built from information supplied by stakeholders during a facilitated work session. It is a useful tool that helps me to ask the right questions and to keep the stakeholder audience focused on the things of importance. The Context Diagram helps me to start thinking about those ‘things’ the organization needs to keep information about in order to manage relationships, service levels, quality and efficiency.

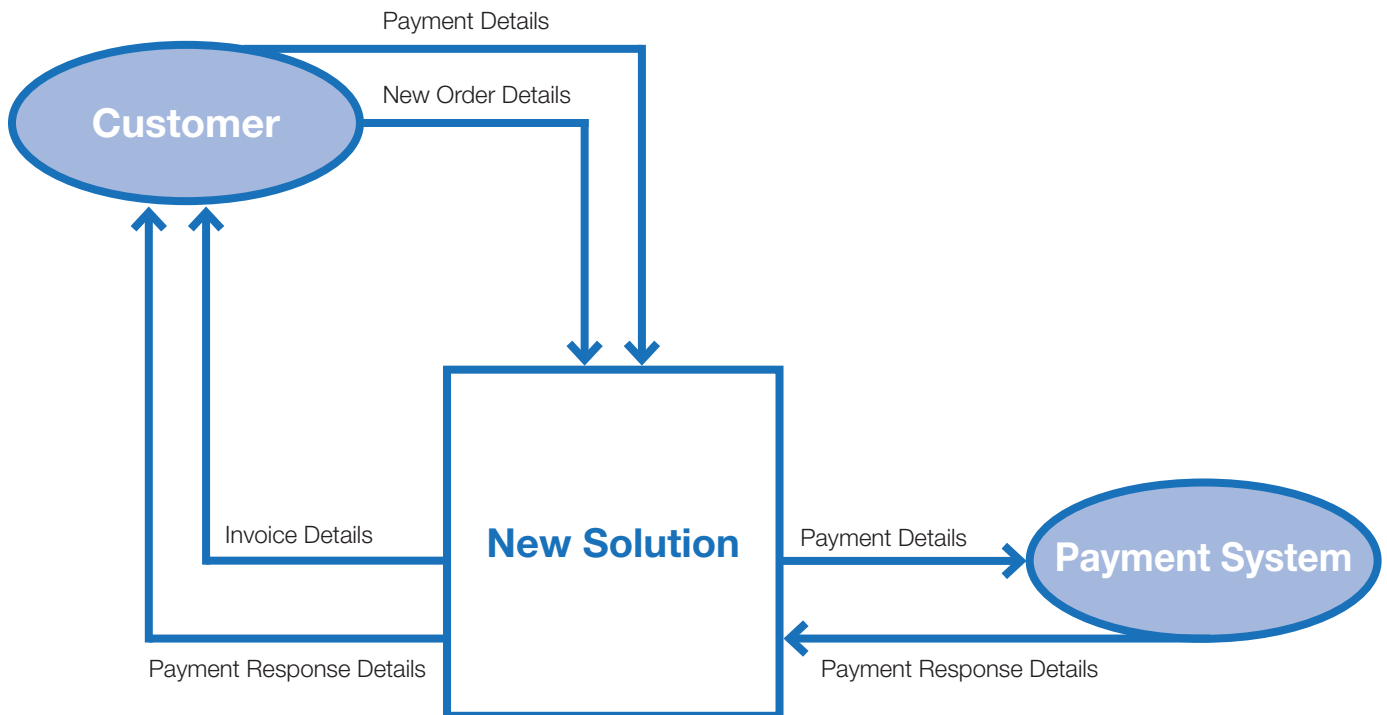


Figure 2: Context Diagram - Example 2

For example, in the above diagram, I see ‘clues’ of the ‘things’ about which the new solution must store information. For example:

1. **Customer** (the business wishes to manage customer relationships and to market new products and services to the Customer);
2. **Order** (the business will want to understand who their primary customers are and the frequency and size of the orders they place);
3. **Payment** (the business will want to get their money as quickly as possible and will also need to know those customers who may be late with their payment or in arrears);
4. **Invoice** (the business will want to reconcile outstanding invoices to payments received, they may also wish to analyze invoice items to identify most popular stock items), etc.

At this point, I begin to build the Conceptual level Entity Relationship Diagram in parallel to the Context Diagram. At the Conceptual level, I am only concerned with identifying the entities, their relationship to each other and the cardinalities (cardinality is a mathematical constraint imposed by the business and they form the fundamental business rules regarding how the business wants to store and manage business information).

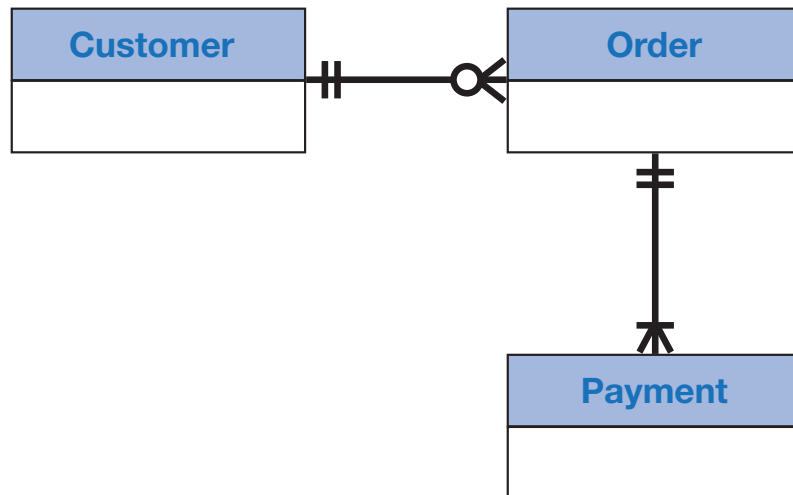


Figure 3: Entity Relationship Diagram - Example 1

If we look at the Context Diagram again we will see that the Entity Relationship Diagram above is beginning to support the business needs. For example the Customer entity will hold attributes to support the business' need to manage customer relationships and to market to the customer. This indicates a Customer record can be created without a mandatory order record. This situation gives rise to more questions, such as:

- What period will be required to 'market' to the customer? The business may not want to market to the customer on an indefinite basis.
- At what stage will the record be removed from the data base if no response is received from the marketing efforts?
- Does 'removal' mean the record is purged/deleted or will it be moved to another database for further marketing effort? If so, what is the frequency of transfer?
- We now know Customer will have different lifecycle statuses? What are the statuses? When does a Customer become a Customer? Prior to the creation of an order, is the Customer viewed as a Lead or Potential Customer?
- If a Customer relationship is 'Dormant' after what period of dormancy is the record closed/terminated? After what period of inactivity will the Customer record be viewed as 'Dormant'?

- Is the interface to the Payment System indicated on the Context Diagram expected to be real time per transaction or will transactions be batched and transferred overnight?
- How is the payment data stored in the Payment System? I would have to match the attributes in the Entity Relationship Diagram to the Payment System to prevent data conversion issues. If changes are required to the Payment System, the changes have to be included in the requirements list, plan and budget and resources will have to be allocated to make the changes to the Payment System within the project constraints of time and budget. If the changes cannot be included there is a risk the New Solution will fail. What alternative business work-around should be considered to minimize risk of failure?

As you can see, from two very, very small diagrams, I have already identified a number of questions I would pose to stakeholders for clarification. During this time, I am prepared for conflict mainly because the group consists of people from operations who interact on a daily basis with customer purchases. From their perspective, customers order goods and are billed for the goods. However in the stakeholder group people from Marketing Division were invited to provide understanding of how the company markets its goods and services to customers. During the course of discussion Marketing made it clear they market to potential customers as a means to grow customer numbers and by implication, increase revenue.

If I built the data model based only on the Operational perspective, the relationship between customer and order would be “Customer may have one or many Orders”:



Figure 4: Entity Relationship Diagram - Example 2

However as Marketing Division wish to actively grow the customer base, a change was made to the cardinality that would allow for the marketing activities, thus the relationship between Customer and Order is “Customer may have zero or many Orders”:

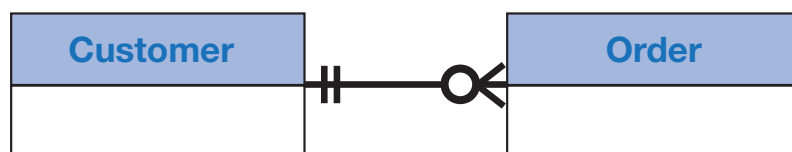


Figure 5: Entity Relationship Diagram - Example 3

Implications for the Context Diagram

Having obtained a clearer understanding of Marketing Division's needs, the Context Diagram has another entity added to it, 'Marketing Division', with an output from the New Solution. At this stage, all we know is that a listing of all customer records must be produced for Marketing Division. We still do not understand the type of customer information they need; the frequency with which the list must be produced or the method of delivery (automatic interface to a marketing system or an export to MS Excel and emailed to 'someone' in Marketing?). Furthermore, the inclusion of Marketing Division raises further questions that need investigation for example; will it be necessary to include an indicator on the customer record of the marketing efforts? If so, what formats will the indicator take on, an incremental number count or the date of the marketing attempt? What other information must be kept to indicate whether the marketing efforts were successful or not?

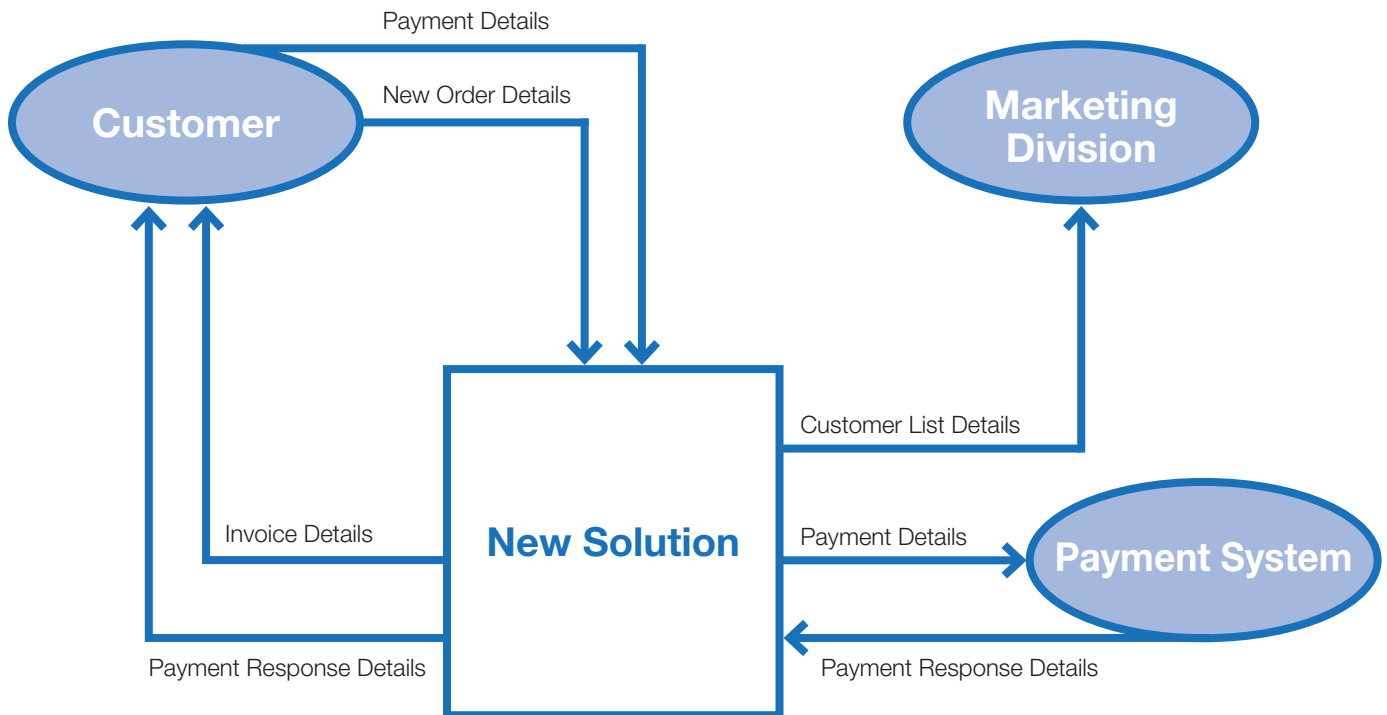


Figure 6: Context Diagram - Example 3

The Context Diagram is updated again to include an input from Marketing Division to update Customer Marketing Promotion Indicator details on the Customer record. Storing this Indicator will allow the organization to manage the effectiveness of the marketing efforts as well as the cost of the efforts. The cost of any marketing effort must be equal or less than the value of return. In other words, if a marketing promotion cost is £1000 the take up rate by customers must break even or show an increase in business, therefore an increase in revenue. Further questions are asked. How many customer records will be impacted by the marketing effort? Is a User Interface required for 'someone' in Marketing Division to update the Indicator attribute on customer records,

or will Marketing provide an electronic list that will be imported into the New Solution? What will be the frequency of import? Technology is not discussed! The questions focus on business needs.

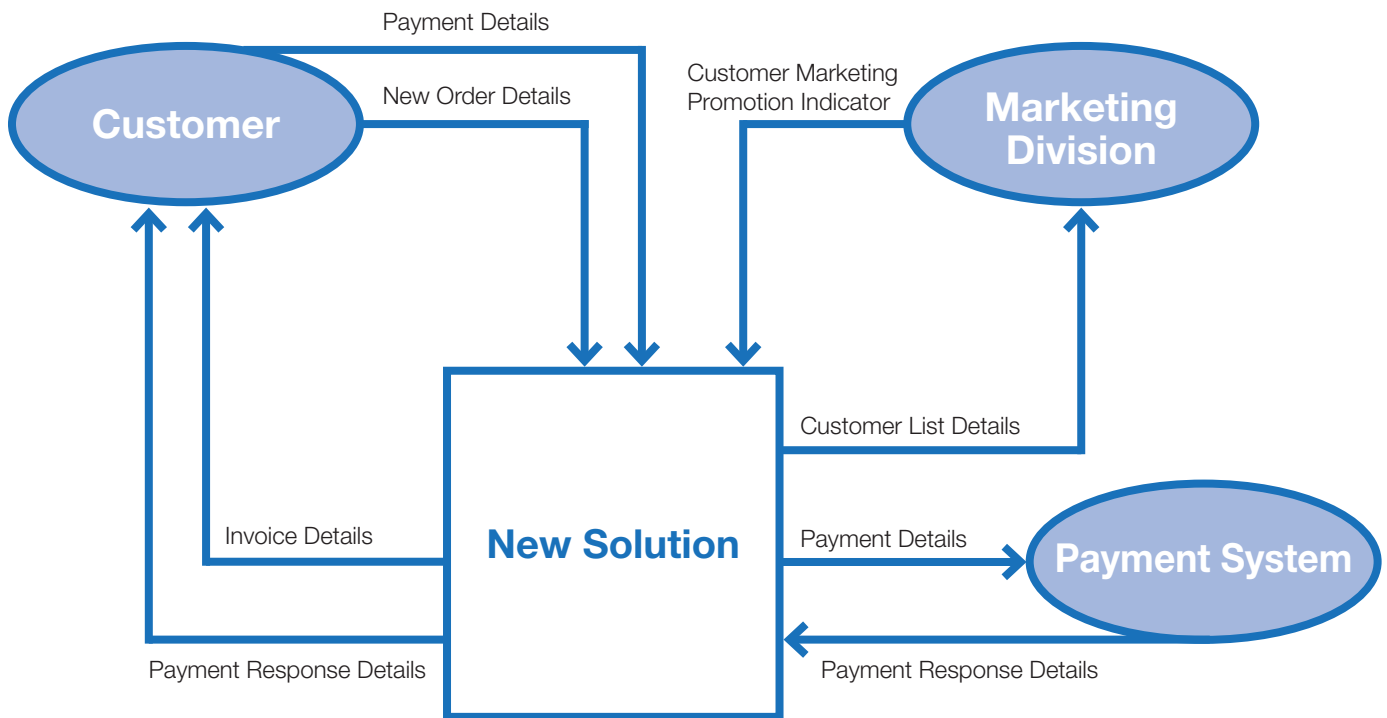


Figure 7: Context Diagram - Example 4

Identifying Processes

Through facilitated and iterative work sessions with the right stakeholders the above diagrams will continue to mature until consensus is reached that all the business aspects have been considered and documented in the diagrams. The diagrams can become very complex and a good Business Analyst will know how to manage the complexity using different techniques such as numbering the input and output flows using different colours, etc. in an effort to 'keep it simple' for the stakeholders to understand and validate. Having completed the Context Diagram, attributes are added to the Entities on the ERD that will provide the stakeholders with the information needed to perform the business. At the Conceptual Level focus is on identifying the Entity types, relationships, cardinalities and attributes that have the most business meaning. It is at the Logical Level that the ERD is expanded and improved by breaking out repeating groups and normalizing data to 3rd Normal Form (3NF). Data Modeling is a key skill all Business Analysis practitioners must master. An ERD, when built correctly and in parallel to other modeling techniques, becomes a very powerful tool for the Business Analyst to produce excellent Requirements and to effectively communicate these business needs to the IT development team.

Having completed the Context Diagram the next step is to identify the processes that will transform inputs into outputs. For example the input

“New Order Details” and the outputs “Invoice Details” and “Customer List Details” may be modeled in a Process Model (using BPM notation) or Use Case (using UML notation) and named “Create New Customer Order”. The modeling notation chosen depends primarily on the skill and comfort of the Business Analyst. The Business Analyst is responsible for documenting and communicating requirements that are accurate and correctly represent the business. An experienced Business Analyst Professional will have mastered most modeling notations and therefore will be comfortable using the best techniques.

What Models to use?

Workflow models are used to describe tasks, decisions, inputs and outputs, people, and tools involved in a specific process. Business Analysts create flowcharts, activity diagrams, or IDEF3 diagrams to represent workflow models. In all cases, a holistic view of the 4 dimensions (see below) is needed to understand requirements fully.

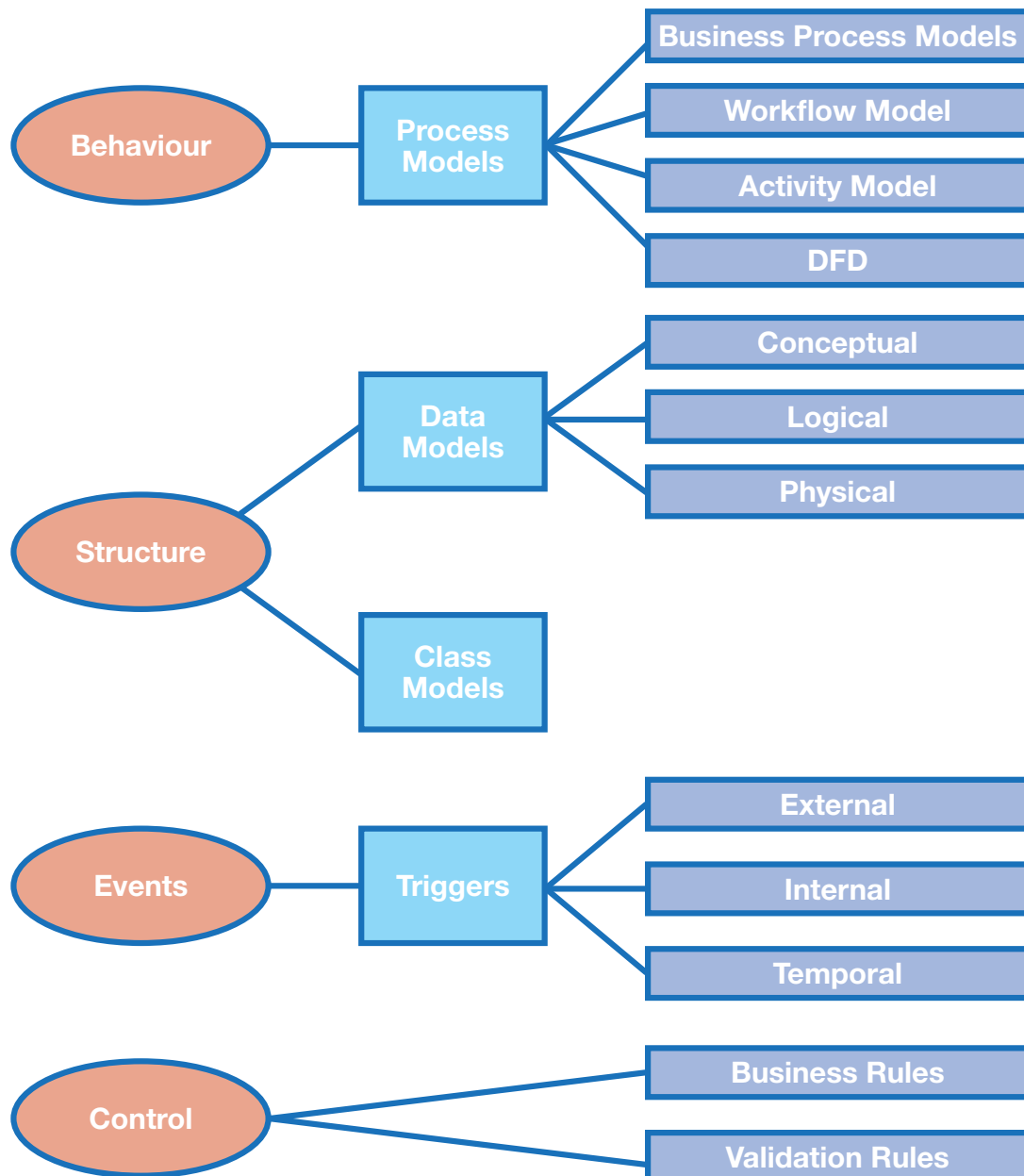


Figure 8: Different types of models are used to represent different dimensions within the Business

Use case models are employed to show the business processes to be automated from the Actor's perspective. A data model is used to represent the information requirements of an organization and Business Analysts create entity relationship diagrams (ERDs) to represent data models.

The risk when data and processes are not understood simultaneously

- Efficient integration does not occur between systems
- Delivered systems fail to meet user needs
- Redundant data and databases proliferate
- IT Systems will constrain business
- Significant time and money is spent on rework, fixes and other databases
- Systems development does not align to the business needs
- Incorrect Vendor solutions may be selected
- Missing or incorrect management information
- Poor customer service
- Poor understanding of data and terminology across business units

One Fact in One Place

For any business to remain effective and profitable in the current economic climate, it is vital to understand the data needed to support the business unit. A synchronized view of the process and data is needed to ensure the business operates at the correct level of efficiency.

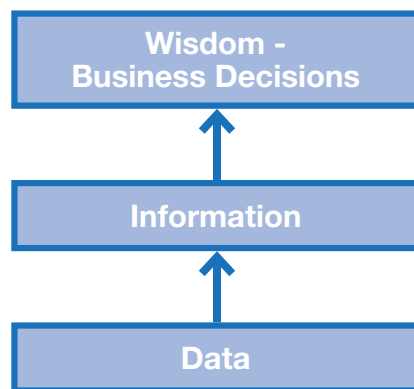


Figure 9: A synchronized view of the data needed to support business decisions is vital

It must be kept in mind that data modelling at the Conceptual and Logical levels uses business descriptions and terminology and is independent of any technology implementation. Do not forget business area experts and users must be included in facilitated work sessions and must agree on common names and shared usage of information within

the organisation. Again data and process are not mutually exclusive; they must be worked on simultaneously by the Business Analyst.

Synchronize data and process modeling

The Entity Relationship Diagram is used to describe the entities of interest to the organisation and the relationships between them.

Logical ERDs are used by Business Analysts to:

- Develop and document an understanding of entities of significance to a business area and the rules that govern the relationship between them.
- At a high level, they are used to simplify and clarify complex issues and explain concepts
- At a detailed level, they document the data requirements of a business area
- An ERD is used to present a specification of data requirements to a database designer in a single comprehensive document.

Strengths:

- Used at a high level to develop a conceptual model of the business (often referred to as a Domain Model) with minimum detail or at a detailed level
- Are useful and comprehensive deliverables for a database designer
- Rigor – they are based on mathematical concepts that provide stringent rules for correctness and completeness

Weakness:

- If not presented properly ERDs can be complex and difficult for users to understand and can be seen to be data-centric if not managed correctly by the Business Analyst. Process modelling is completed separately to data models but can be built in parallel to ensure accuracy and completeness of Requirements. Data Models are a powerful tool for Business Analysts to use to uncover detailed Requirements.

A Process/Workflow Model describes how work flows within the business and how information is transformed during the process. Process Models must be a reflection of reality and are built by Business Analysts using techniques such as job-shadowing, observations, focus group sessions, etc. A process model contains the following elements:

- Start
- Input
- Tasks

- Pools and Swim lanes
- Decisions
- Forks (convergent, divergent and parallel activities)
- Outputs
- End

Strengths:

- Easy for stakeholders to identify with
- When enriched with measurements and supporting information, it is easy to identify bottle-necks and problems
- Easy to understand variations and exceptions when applying business rules

Weakness:

- Can be meaningless if they does not reflect reality
- Can become complex and difficult to understand if the correct level of abstraction is not maintained consistently in the diagram
- Can become too large to work

Conclusion

It is the responsibility of the Business Analyst to master the art of eliciting requirements from different stakeholder groups, analyzing the requirements for commonality, documenting the requirements using appropriate techniques and validating requirements with the stakeholder community for accuracy, consistency and completeness. The Business Analyst does all of this by facilitating the appropriate type of stakeholder intervention, remaining neutral throughout the business analysis process and leading the stakeholders' consensus to design the right solution.

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