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Decision Analysis

EBR User Guide #1

What is Decision Analysis?

Decision analysis is a technique to unpack business rules embedded in a decision.

Decision analysis is used to identify key decisions in the day-to-day business operations and capture the decision logic that supports or enables these decisions. By decision logic, we mean the decision structure (model), decision tables, and business rules statements.

Why Decision Analysis?

Decision analysis is an important toolset to use for eliciting business rules. A lot of organisational operations are centred on decisions, e.g. eligibility, calculations, etc. Many of the organisation's business rules are there to support these decisions. Therefore, being able to identify, capture, and analyse these decisions is a fundamental step in discovering an organisation's business rules.

Elements of a Decision

A decision always has the following basic elements:

- A question – this is the determination the decision is addressing, e.g. "Is the applicant eligible for cover?"
- Outcomes – these are potential outcomes to the question being addressed, e.g. yes/no, eligible/not eligible
- Cases in scope – the real-world scenarios that require the decision to be resolved, e.g. Jon Doe applies for cover for their insurance policy
- Business Rules – the guidance that links a case to the appropriate outcome, e.g. all the criteria that determine whether an applicant is eligible or not eligible for cover

Identifying a Decision

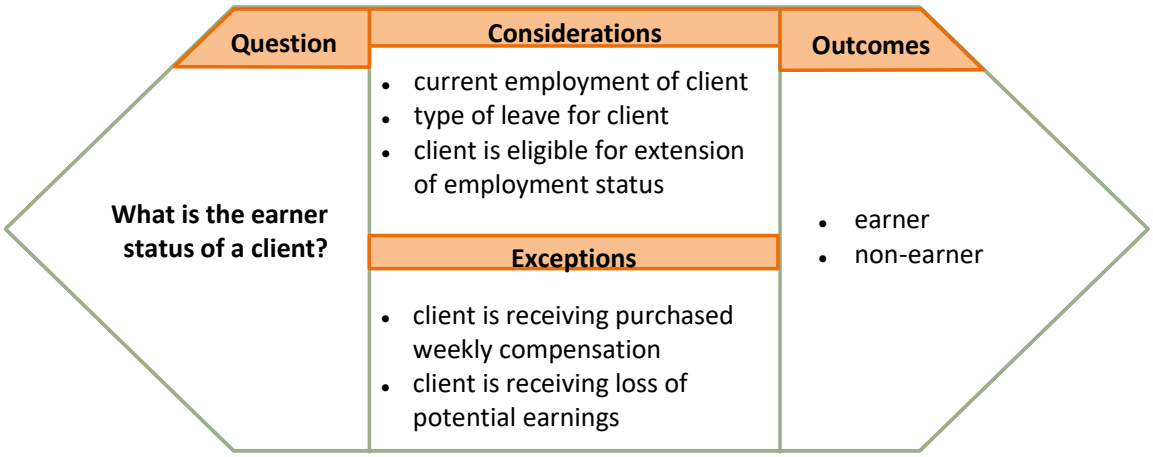
A decision can usually be identified within a process. In a standard process model notation, such as BPMN 2.0, decisions are represented by a specific (diamond) task shape. In Promapp processes, decisions might be spelled out as notes within a procedure step.

However, this may not necessarily be true for all decisions. Some decisions may be hidden or implicit and will require careful analysis to be fleshed out.

How to analyse a decision

We use the 'Q-COE' model to analyse and structure decisions. Q-COE stands for **Q**uestion, **C**onsiderations, **O**utcomes, and **E**xceptions.

Q-COE Example



Question

A decision must have a question that it is addressing or looking to answer. The question represents the name/identity of a decision. How the question is expressed is important for effective decision analysis.

Structuring the question for a decision well helps with:

- Clear communication of what the decision is about
- Delineating the scope of the decision
- Capturing declarative decision logic

Expressed in Business Language

The question a decision addresses should be expressed clearly in business language that is natural for business people. It should use business terminology, not field names for stored data or any other form of IT Speak. Examples of well-formed questions:

- Should an insurance claim be accepted, rejected, or investigated for fraud?
- Which resource should be assigned to a task?
- Which service should be used to ship a package?

The question should be based directly on a structured business vocabulary (concept model).

Because decisions are captured at a business level, every aspect of the decision must be business related not IT based. For example, in the decision 'what is the earner status of a client?', a database may have an 'unknown' or 'unassigned' earner status. However, at a business level, this is not a possible outcome. Therefore, a decision should not incorporate these IT based outcomes.

The decision question must be aligned to the outcome(s)

The question should always align with the potential outcomes captured for that decision.

For example, if a decision question “What coat should be worn?” had the potential outcomes: umbrella, raincoat, wool overcoat, etc, then something would be amiss. The question and the outcome “umbrella” do not align. An umbrella is not a coat that can be worn. This decision should be reframed.

Things to Avoid

The use of ‘how’

Do not use the verb ‘how’ in the question. The verb ‘how’ suggests a process or procedure, not a declarative decision statement.

Think about how this activity would be captured in a process. Usually such a task will be documented as ‘Determine total price’. Therefore, change the question to: “What is the total price for a customer?”

The use of ‘must’

Never use the word ‘must’ in a question. Instead use ‘should’. ‘Must’ is used in the construction of business rule statements to indicate a level of strictness for the outcome.

Use of conjunctions

A question, like a business rule, should only address one subject. Use of conjunctions (‘and’, ‘or’, ‘but’) implies multiple subjects and separate decisions. If a question includes a conjunction then it should be re-analysed and separated if possible.

Use of personal pronouns

A question should never be expressed with a personal pronoun. Decisions take the same approach as business rules and should be declarative universal statements. Examples of personal pronouns are I, you, me, she, he, etc.

Use of conversational shortcuts

A conversational shortcut includes words like here, there, now, this, etc. An example of a decision question with a conversational shortcut would be:

- “What is the total price for *this* order?”

This should be changed to:

- “What is the total price for *an* order?”

Considerations

Considerations are the factors required to make the decision. For example, in determining a person’s eligibility for a driver’s licence, an important consideration or factor would be the age of the person. Considerations are always the standard factors that must be applied to the decision.

Exceptions

An exception or exceptional case is a situation that is not based on or does not use the standard considerations for that decision. For example, in determining a person's eligibility for a driver's licence, the standard considerations may be age of the person, length of time using a learner's licence, not having a recent driving conviction, etc. Exceptional cases might be where driver's with a recent driving conviction are granted a licence based on family or employment obligations that are outside the standard considerations.

Exceptional cases should account for no more than about 20% of the possible cases for a decision. Therefore, if you find that a decision has more exceptional cases than this, you should review the standard considerations captured.

Outcome

A decision must show all the potential outcomes for the decision question. Here are the types of decision outcomes for decision questions.

Types of Decision Outcomes

Type of Outcomes	Example	Comment
Boolean (yes/no; true/false)	eligible/ineligible	Actual outcomes can be expressed as facts, for example *The applicant John Smith is eligible*
Quantity	A dollar amount	If an appropriate quantity can be determined by a formula or calculation, techniques other than decision analysis should be used
Category	Silver, Gold, or Platinum customer	Such categories usually, but need not always, fall under the same general concept (in this case "customer tier")
Real-world Instance	Vehicle A, Vehicle B; Employee A, Employee B	Such outcomes cater for decisions with specific instances. Such instances usually, but need not always, fall into the same general concept or class (in this case "fleet vehicles" or "company employees")
Course of Action	On-site visit, teleconference, telephone call, email, fax	Such outcomes should not be expressed in a procedural manner (e.g, when the correct contact mechanism is "fax", not "*send a* fax")

How to structure a decision

Once you have analysed the individual decisions, the next step is to show how the decisions fit together or connect to each other. This is known as decision dependency. This section will introduce you to the types of decision dependencies and how to show them using Q-charts.

Q-Chart

A Q-Chart (Question Chart) is graphical representation of decision dependency. It is used to model decisions, showing how a set of decisions fit together. Analysing and focusing on individual decision may limit your understanding of the complete scope and complexity of business operations and decisions. The use Q-Charts will enable you to better understand the scope and the relationships between the decisions before diving into capturing business rules. It is also a great communication tool to all stakeholders with an interest in the decision(s).

Decision dependencies

There are three kinds of decision dependencies.

Types of Decision Dependencies

Type of Decision Dependency	Effect
Relevance	The outcome from one decision can pre-empt another decision
Consideration	The outcome from one decision provides an answer to or supports a consideration for another decision
Outcome	The outcome from one decision restricts the possible outcomes of another decision

Relevance dependency

A relevance dependency relationship between decisions indicates that one decision is dependent on the outcome of another decision. For example, if we had two decisions, ‘What is the amount of weekly compensation payable to a client?’ and ‘Is a client eligible for weekly compensation?’. A ‘no’ outcome for the second decision, eligibility to weekly compensation, makes the first decision redundant. Therefore, these two decisions have a relevance dependency relationship.

How to show a relevance dependency

Using Q-chart methodology, a relevance dependency relationship is graphically presented as shown in Figure 1 below.

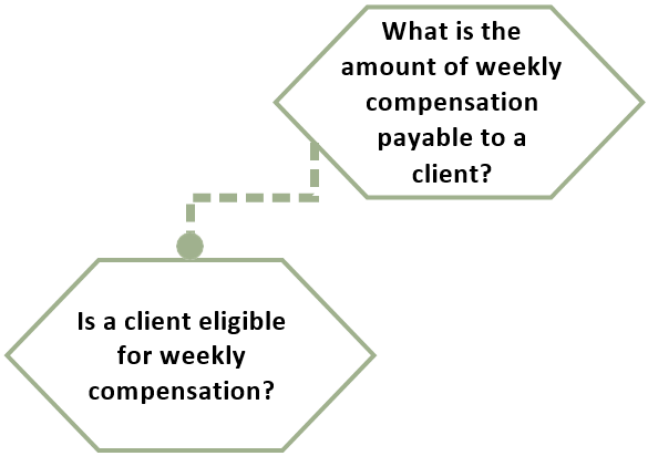


Figure 1 Relevance dependency

The relevance dependency is indicated by a dashed connector with a hitch point at the bottom. The dependent decision is always the upper decision. A relevance dependency dashed connector is always connected from the centre of the independent decision to the left-hand side of the dependent decision.

Consideration dependency

A consideration dependency relationship indicates that a consideration of one decision is determined by another decision. For example, one of the considerations for the decision 'Is a client eligible for weekly compensation?' may be the earner status of the client. Determining the earner status of a client may also be a decision by itself, 'What is the earner status of a client?'. These two decisions have a consideration dependency relationship.

How to show a consideration dependency

Using Q-chart methodology, a consideration dependency is graphically presented as per Figure 2 below.

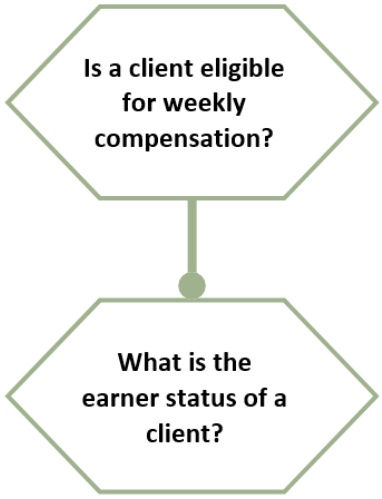


Figure 2 Consideration dependency

The consideration dependency is indicated by a solid-line connector with a hitch point at the bottom. The dependent decision is always the upper (higher) decision. A consideration dependency solid-line connector is always connected from the centre of the independent decision to the centre of the independent decision.

Outcome dependency

An outcome dependency relationship indicates that the outcome of one decision (the dependent decision) is dictated by the outcome of the independent decision. For this to occur, then both of the following must be true:

- Both decisions must have the same kind of outcome, e.g. cost.
- The considerations in the independent decision must be the same as, or a subset of the considerations of, the dependent decision (upper decision).

An example of decisions with an outcome dependency relationship could be the following decisions: 'What is the amount of weekly compensation payable to a client?' and 'What is the maximum amount of weekly compensation payable to a client?'.

If a client is paid the maximum amount of weekly compensation, then this informs the outcome of the decision 'what is the amount of weekly compensation payable to that client?'.

How to show an outcome dependency

Using Q-chart methodology, an outcome dependency relationship is graphically represented as per Figure 3 below.

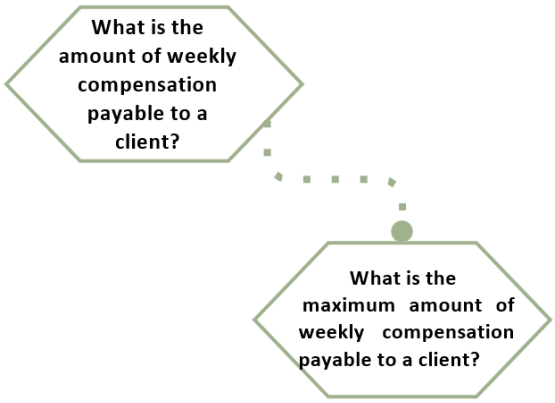


Figure 3 Outcome dependency

The outcome dependency is indicated by a dotted-line connector with a hitch point at the bottom. The dependent decision is always the upper (higher) decision. An outcome dependency dotted-line connector is always connected from the right-side of the dependent decision to the centre of the independent decision.

Putting the Q-chart together

Once you have established the decision dependencies, then you need to bring them all together into a single decision model. A Q-chart is always model to show the most dependent decision on top. All the decisions that support this dependent decision sit below it linked together by the type of dependency. Figure 4 below represents how the above decision dependencies will look in a single Q-chart.

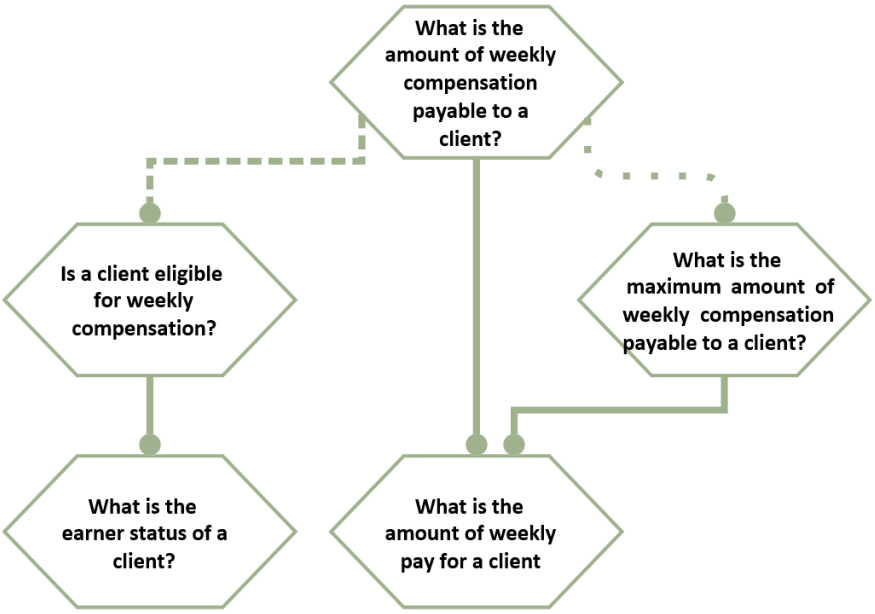


Figure 4 Overall Q-chart for the weekly compensation decision