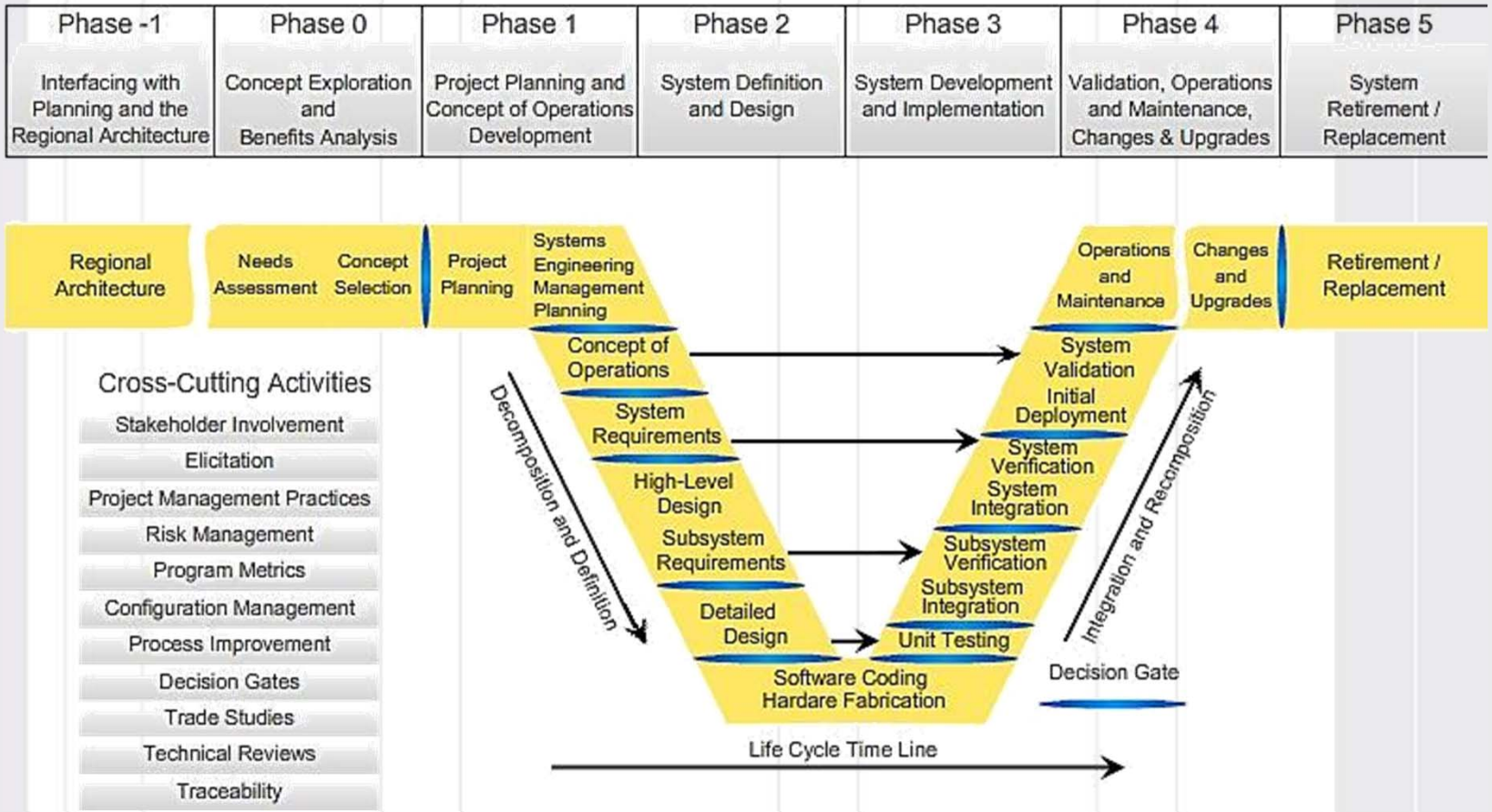
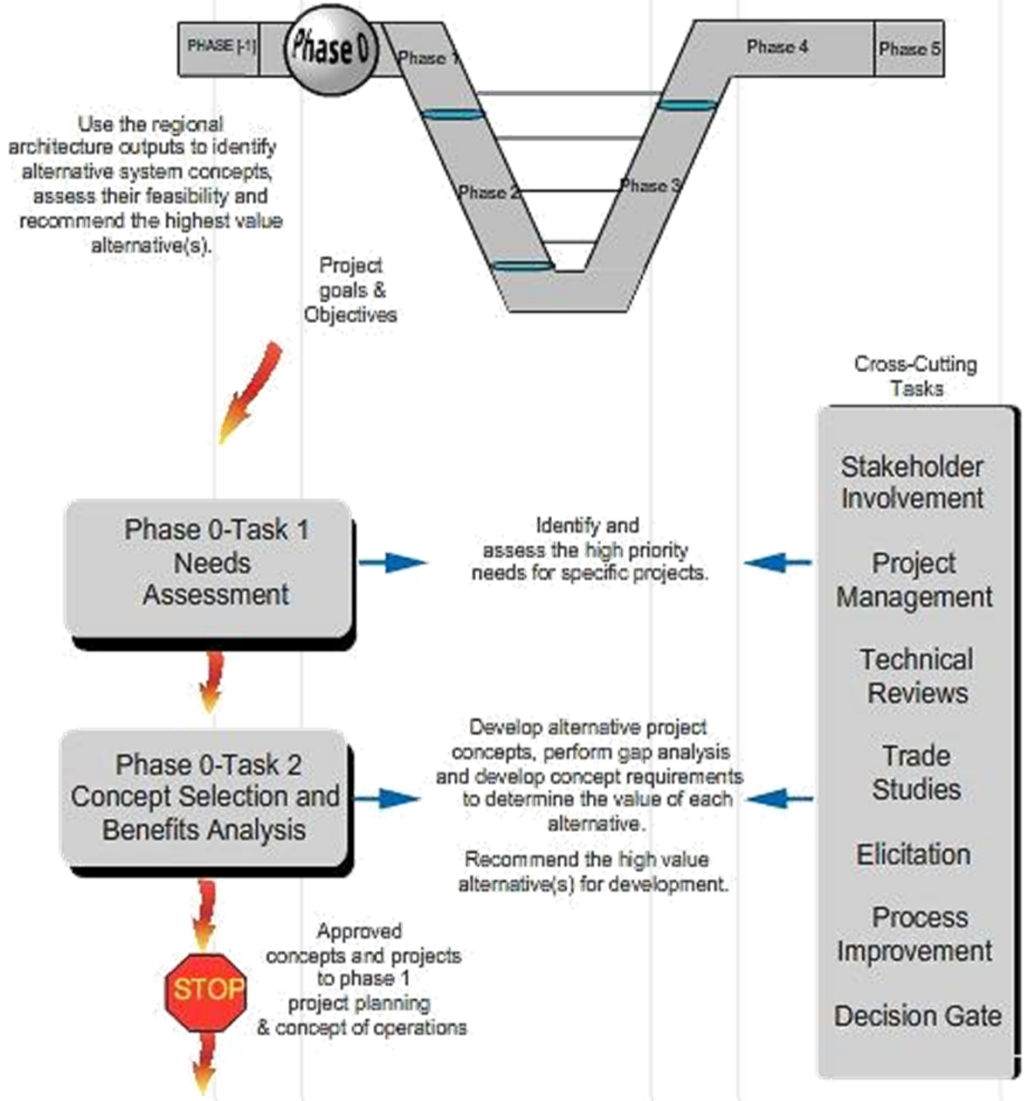
V Model



Systems Engineering Guidebook for ITS

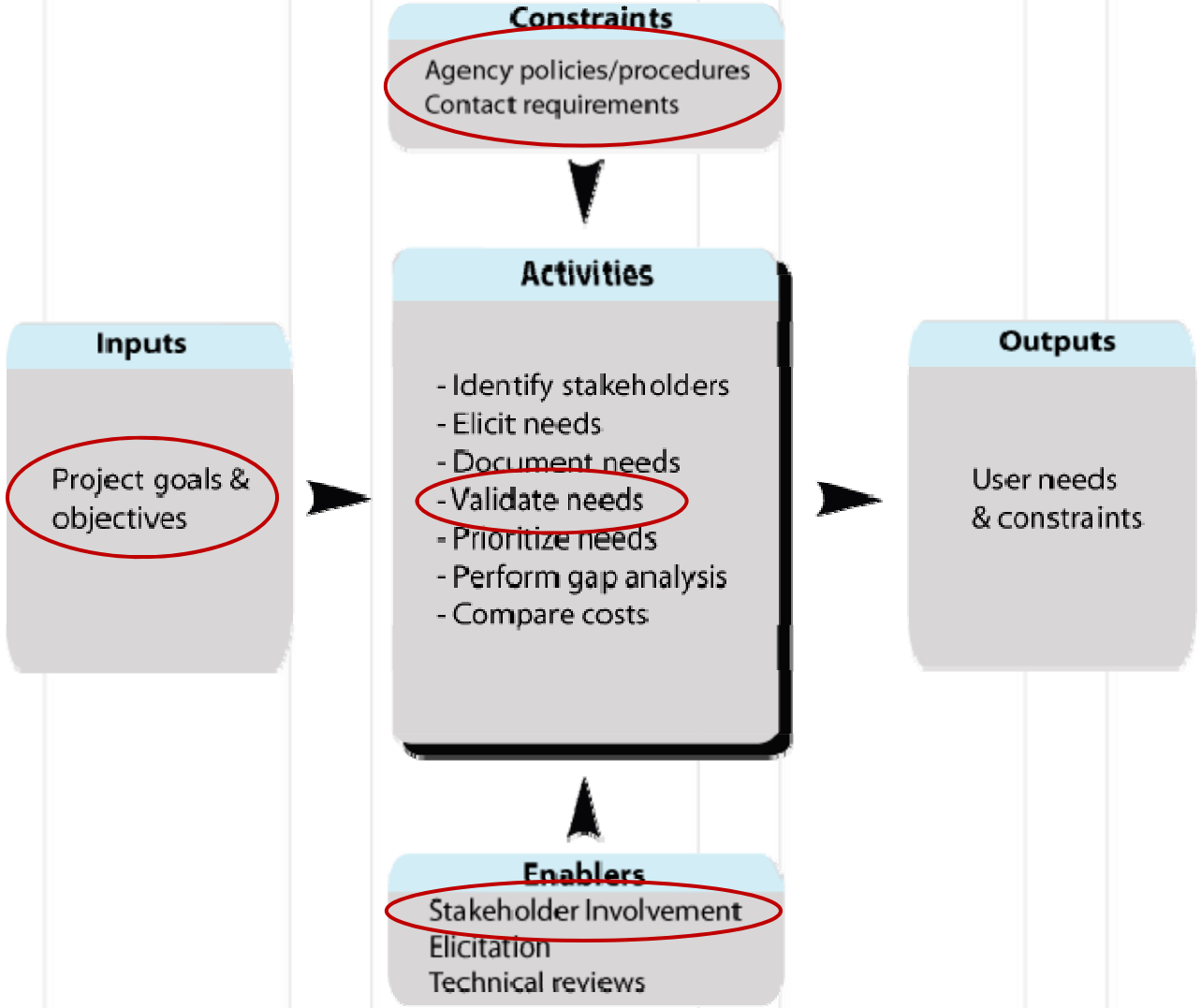
Concept exploration and benefits analysis



Needs Assessment

- Needs assessment is an activity accomplished early in system development to ensure that the system meets the most important needs of the project's stakeholders.
- The goal is to ensure that their needs are well understood before starting development.
- In many cases, there will be more needs than can be met, even conflicting needs.
- So, prioritization is necessary.

Needs Assessment



Needs Assessment

- Identify stakeholders
  - Identify the stakeholders who will own, operate, maintain, use, interface with, benefit from or otherwise be affected by the system.
- Elicit needs
  - Needs assessment must set aside any preconceived notions of what the system will do. It then elicits the stakeholders' needs, desires, and constraints by various means, as described in 3.8.2. Some of the techniques are literature search, day-in-the-life studies, surveys, one-on-one interviews, and workshops.
- Document needs
  - Consolidate the results of the elicitation process into a document. If there are many stakeholders it may be helpful to summarize the results, e.g., 75% of the local agencies cited a need for real-time freeway speed data. It is important to include all constraints, such as the restrictions on data sharing.

Needs Assessment

- Validate needs
  - Present the consolidated results to the stakeholders. This is best done in a workshop where the stakeholders are encouraged to give feedback and have discussions. Continue the discussions until they agree all of their needs have been captured.
- Prioritize needs
  - Generally, all of the needs cannot be met and, sometimes, may be conflicting. Analysis of the needs identifies the highest priority needs on which to focus. This may be done by a priorities analysis, surveys, or consensus.
- Perform gap analysis
  - Inventory current systems that may contribute to fulfilling the identified needs. Rank each need in terms of both the breadth and depth [criticality] of the gap between current and desired capabilities.
  - Gap analysis
    - A technique to assess how far current [legacy] capabilities are from meeting the identified needs, to be used to prioritize development activities. This is based both on how far the current capabilities are from meeting the needs [because of insufficient functionality, capabilities, performance or capacity] and whether the need is met in some places and not others.

Needs Assessment

- Compare costs
  - Estimate the cost to meet each of the needs. Qualitative estimates may be sufficient, such as high/medium/low, or easy/moderate/difficult to implement.

- Validate key needs
  - Taking into account the priorities [gaps and costs], identify the most pressing needs. Document them and the rationale behind them. Present these conclusions to the stakeholders for discussion and concurrence. Modify key needs as warranted. Update the documentation.

Which activities are critical for the system's owner to do?

- Provide the initial statement of needs.
- Provide data and information on current system capabilities relative to the needs.
- Supply any existing documentation of needs.
- Identify the stakeholders and encourage their inputs.
- Participate in any interviews, surveys, workshops, or other activities developed for the identification, clarification, and prioritization of needs.
- Review statements of needs.

On the technical side:

- Level of disagreement among stakeholders on high priority needs, since it risks producing a system whose purpose is unfocused and satisfies no one
- Percentage of the important needs that cannot be met within the budget, since such needs may motivate scope creep
- Number of expressed needs that are in conflict, since they must be resolved before proceeding

On the project management side:

- Number of stakeholders whose needs have been captured
- Number of stakeholders who agree with the final selection of key needs

Checklist: Are all the bases covered?

- Have all relevant stakeholders been represented?
- Have all appropriate resources been utilized to elicit needs?
- Have all collected needs and conclusions been reviewed with the stakeholders?
- Is there an objective and justifiable approach for prioritizing needs?
- Are conclusions and rationale well documented?
- Have all stakeholders agreed that their needs are clearly and fairly represented?

Stakeholder Involvment

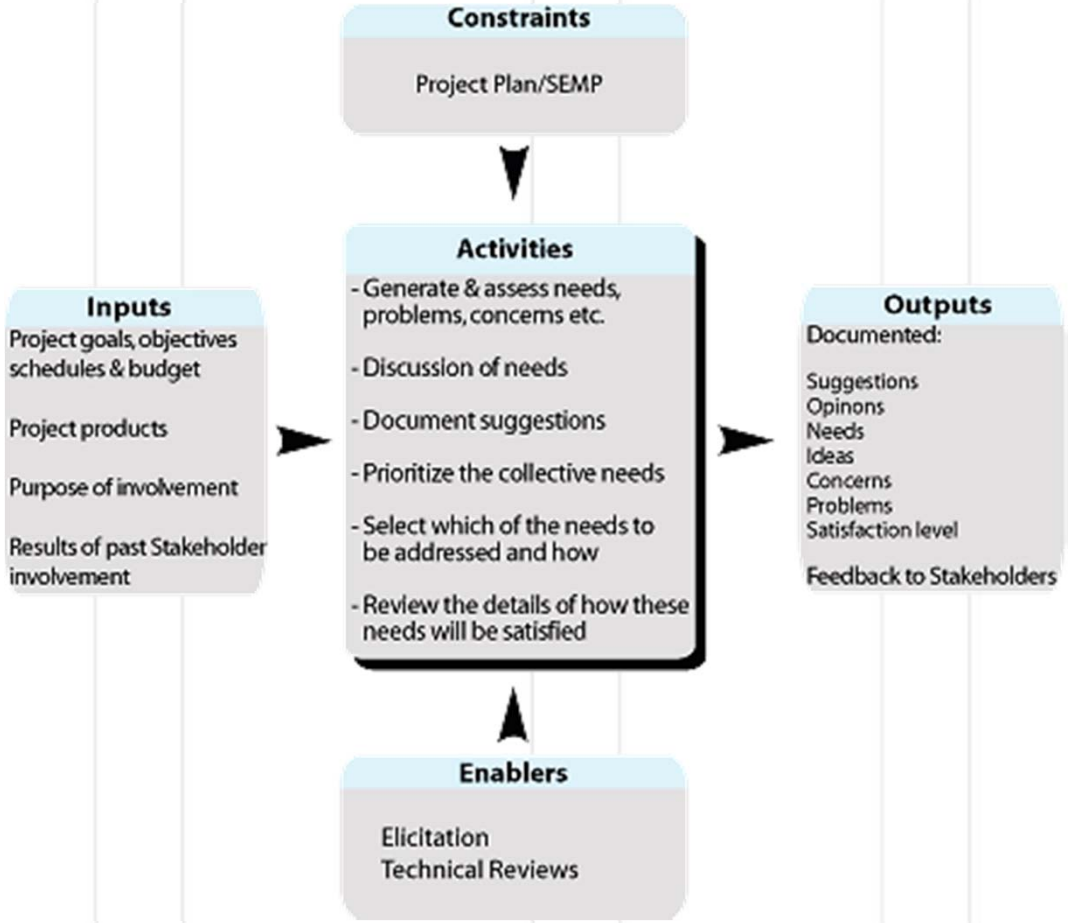
- Stakeholders
  - The people for whom the system is being built, as well as anyone who will manage, develop, operate, maintain, use, benefit from, or otherwise be affected by the system.

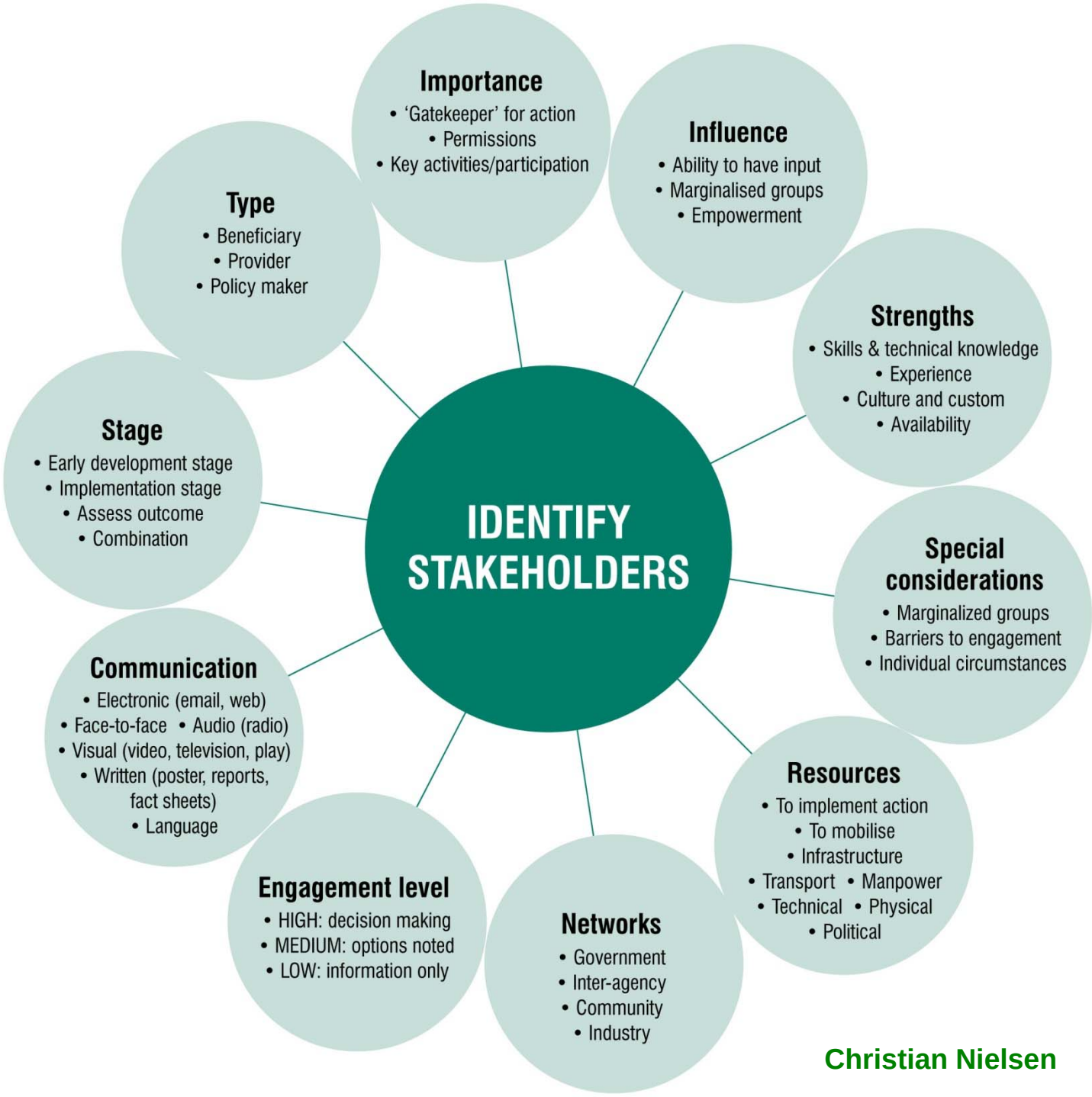
What is Stakeholder Analysis ?

- The Stakeholder Analysis is a method for identifying internal and external stakeholders, their concern and objectives, their potential influence, and how to deal with them.

- Why use it ?
  - Managing the stakeholders relationships is an important key in reaching a successful project outcome. The analysis is an important part of defining the projects purpose, objectives and success criteria - in general and in respect of the key stakeholders. The analysis is a part of the foundation for organising the project, developing contract strategies and strategies for issues outside the contractual requirements, and for developing communication plans with the internal and external stakeholders.

Stakeholder Involvement Process





Christian Nielsen

Key analyses

Attitude

- Supportive
- Indifferent
- Opposed

Interested or not interested?

- Approachability?
- Flexibility?
- Ability to ‘block” if remaining opposed?

Influence

- Decision-maker
- Policy – maker
- Access ‘gate-keeper’

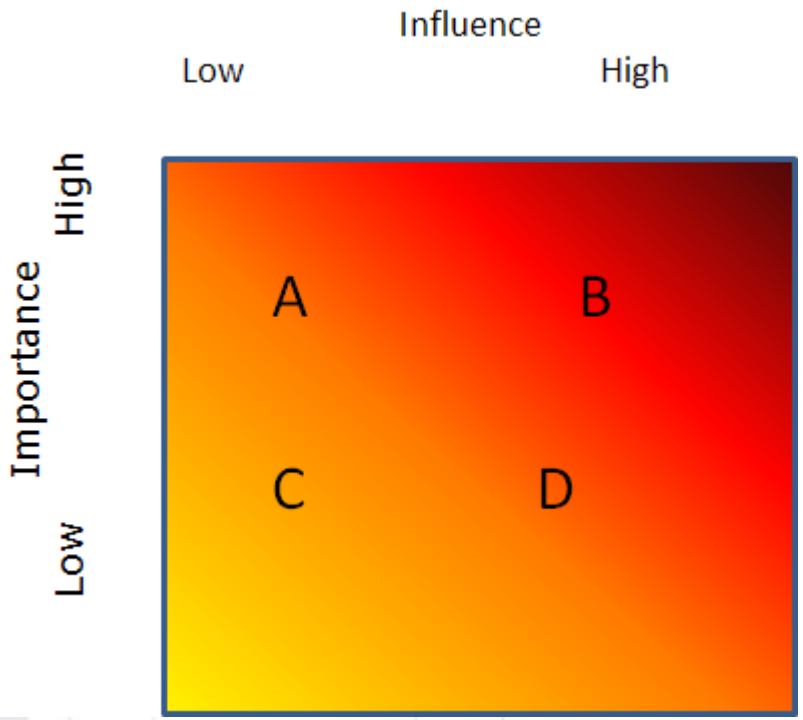
Supportive or opposed?

- Accesibility?
- Open-mindedness
- Willingness to use influence to change outcome (+ or -)

VIP stakeholders

- Who is most important?
  - The group with the money?
  - The group with the most influence?
  - The ‘trouble-maker’
  - The group with the biggest network?
  - The group at the end of it all?
- All are VIP stakeholders but…..

Importance



A : Keep satisfied

B : **Key player**

Beware a key player with strong opposition

C : Keep informed

D : Keep engaged

- **Be mindful of marginalized groups whose 'low influence' may come from poor opportunity**

Elicitation

- Elicitation is a set of techniques for drawing out stakeholder needs, goals, requirements, constraints, priorities, normal operations, and preferences.
- It is done early in system development to support the initial needs assessment leading to the development of requirements.
- As the project progresses, the process is revisited as necessary to provide further clarification.

Elicitation Process