

The logo for Ansto, featuring the word "Ansto" in a bold, blue, sans-serif font.

Establishing the conditions for the successful implementation of public private partnerships in research reactor project in newcomer countries

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Introduction

- The United Arab Emirates (UAE) is currently developing a peaceful nuclear energy program to respond to future energy demands.
- The UAE is encouraged to pursue research activities to compliment the energy generation project.
- Such research will require the development of a research reactor project, which will not only benefit research to support nuclear power plant operations, but also all industries identified in the UAE's growth strategies. These industries include transportation, health services, construction, petro chemicals, technical colleges, and R&D facilities.

Introduction

- A research reactor requires a heavy, upfront investment and poses high risks to governments due to potential lack of skills, experience, and high operation and maintenance expenses.
- However, if utilized properly, a research reactor could become a valuable player in the long-term economic growth of the country, and it is here where the private sector can play a vital role.
- The collaboration between governments and private parties through public private partnerships (PPP) can maximize the benefits expected from the adoption of a research reactor project.

Introduction

- PPPs are "long-term relationships involving the private sector in the provision of public services that in many cases had previously been entirely the responsibility of the public sector".
- PPPs have become very popular mechanisms for procuring public works around the globe due to their high success rate in bringing quality, efficiency, innovation, funds, experience, and most importantly, risk sharing to developed projects.
- Therefore, PPPs are expected to maximize the benefits sought after in the adoption of a research reactor project.
- PPPs are expected to improve the utilization of research reactors through the efficiency they bring to the developed project.

Introduction

- Goldman, Adelfang, Alldred & Mote (2008), in their study 'Progress in Promoting Research Reactor Coalitions', stated that in order to improve the utilization of research reactors, "Public-private partnerships need to be pursued"
- This study will highlight the benefits of sharing risks and, equally, the financial benefits between the public and private sectors to maximize the outcome of a research reactor.
- This research, also, takes the initiative to highlight for the authorities the particular conditions that impact the success of a research reactor to improve the success rate of developing it under the PPP mechanism.

Introduction

- Previous experiences have demonstrated that research reactors would most likely require some sort of public funding support throughout their lifetime.
- Such funding includes planning cost, bid process, construction, commissioning and decommissioning, operation, disposal of spent fuel and radioactive waste, and facility maintenance.

Introduction

- The financial commitment of the public party is likely to run for decades and will require meticulous planning, careful assessment, and viable funding alternatives before the commencement of the project.
- Therefore, the rationale of this study is to establish the conditions for developing a research reactor project for newcomers through the utilisation of public private partnerships, which was never empirically tested before.

Methodology

- This study is the last phase of an extended study for establishing the CSF for PPPs in research reactor project in the UAE.
- The full study employed a mixed methods research approach.
- The objectives of the study were focused on the formation of a generic PPP framework, the success factors of collaborations between the public and private sectors in developing projects in the UAE, and the success factors for a research reactor project.
- The first two objectives were already achieved in other studies by the researcher.
- A qualitative methodology was used in this study for data collection and analysis for the establishment of the conditions pertaining to the successful implementation of PPP in a research reactor.

Methodology

- There are different types of conditions, and they include causal, intervening, and contextual conditions.
- Causal conditions are the events or happenings that directly affect the phenomena.
- Intervening conditions are the events that alter the influence of causal conditions on the phenomena.
- Finally, contextual conditions are the ones that arise from unforeseen circumstances.
- This study will establish the category for each factor identified by IAEA.

Methodology

- The instrument used was grounded theory.
- First, a questionnaire that guided the design of the interview questions was conducted.
- Next, in-depth semi-structured questions were developed.
- Last, grounded theory and all its steps - open, axial, selective coding, and substantive theory were conducted.

Methodology

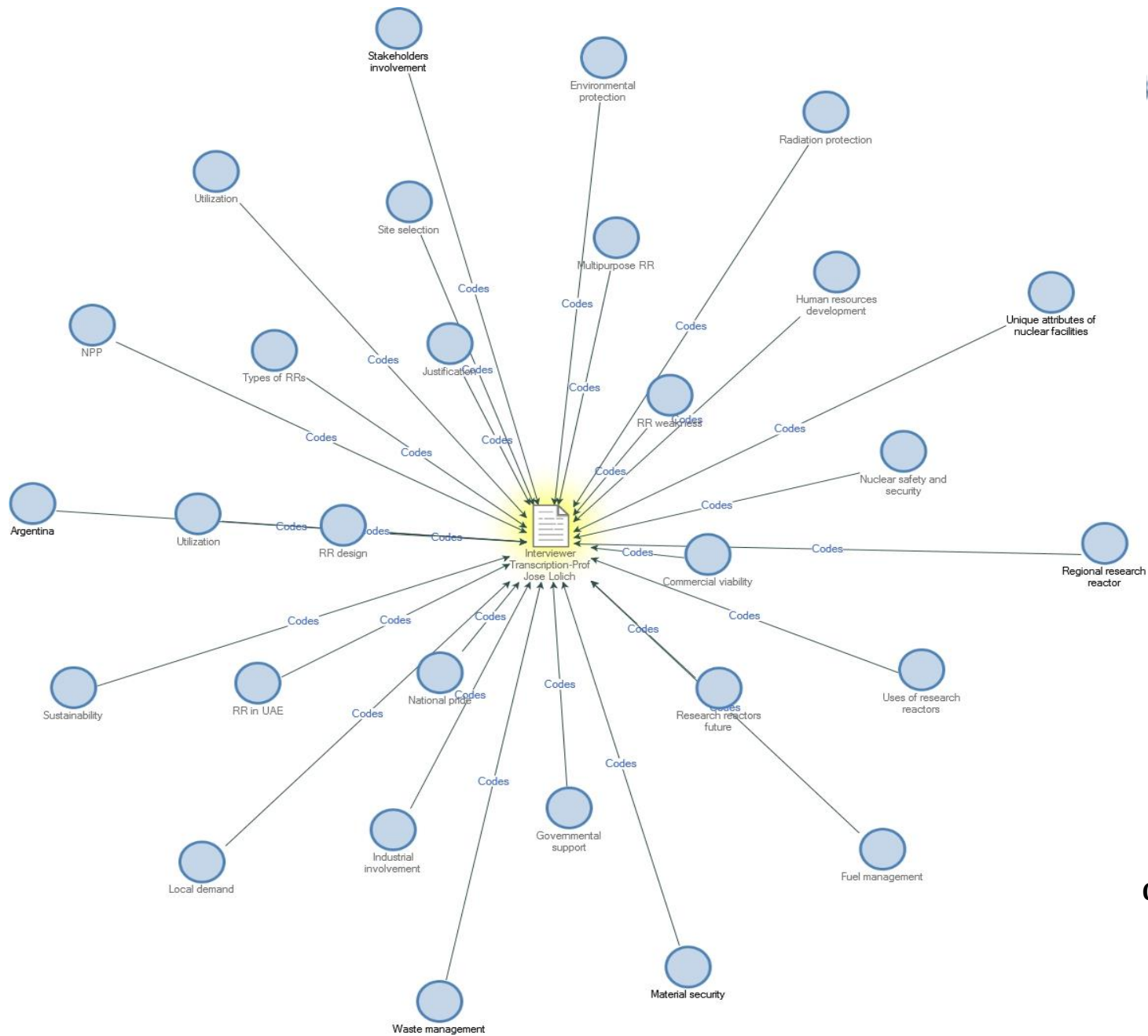
- The purposive sampling process utilised some of the participants at a workshop organized by IAEA entitled "Training Workshop on Specific Considerations and Milestones for Research Reactors Project."
- 15 participants returned completed questionnaires. The analysis of the collected questionnaires proved their value in the finalization of the interview questions.
- The selection criteria for the interviewees focused on individuals who are in senior positions in research reactor projects within the leading countries in this industry.

Methodology

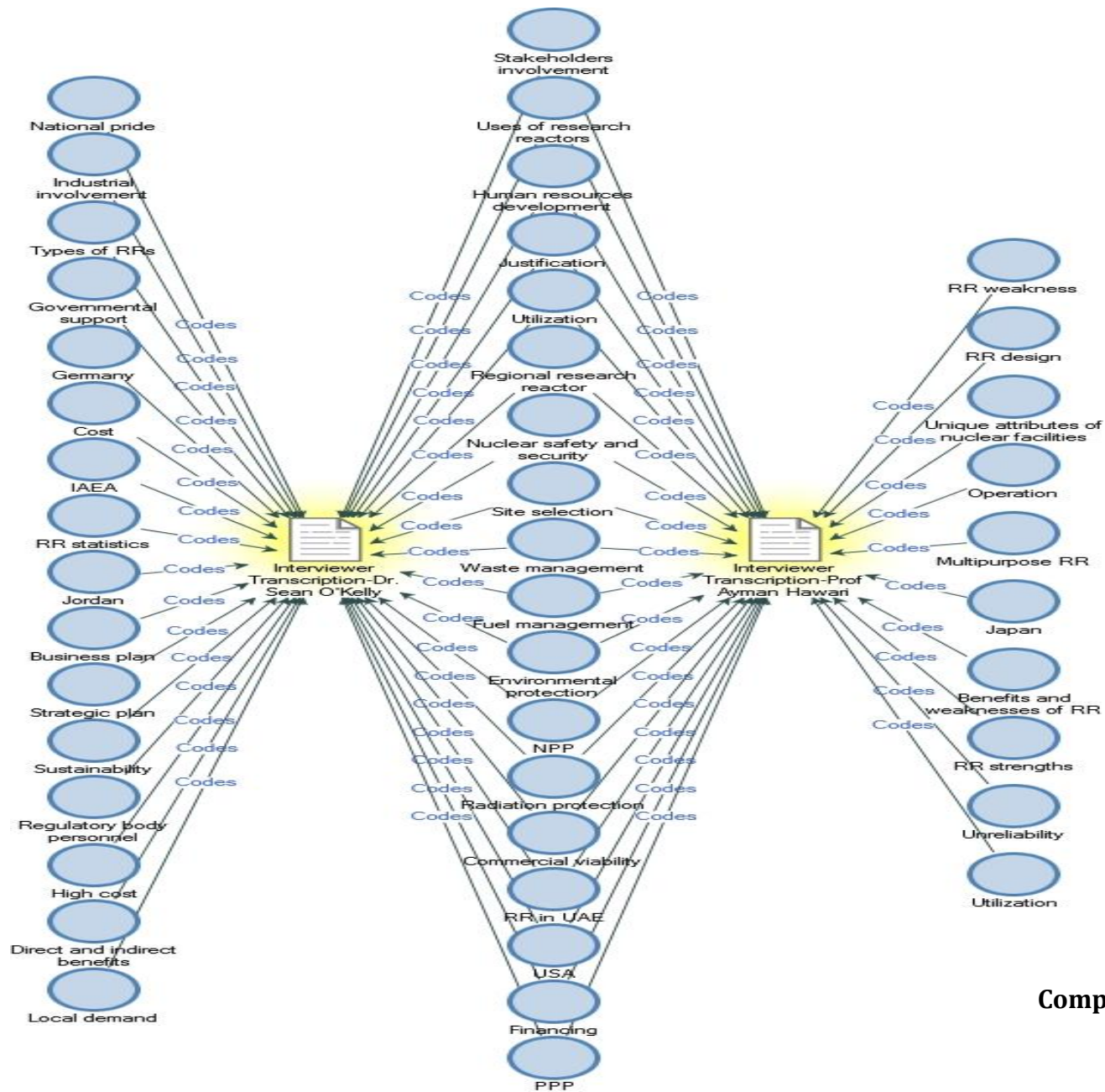
- Therefore, the technique used for the initial identification of the subjects was purposive sampling.
- Snowball sampling also was used for the interviews due to the limited number of subjects identified since PPP practice in RR is relatively scarce.

Results and analysis

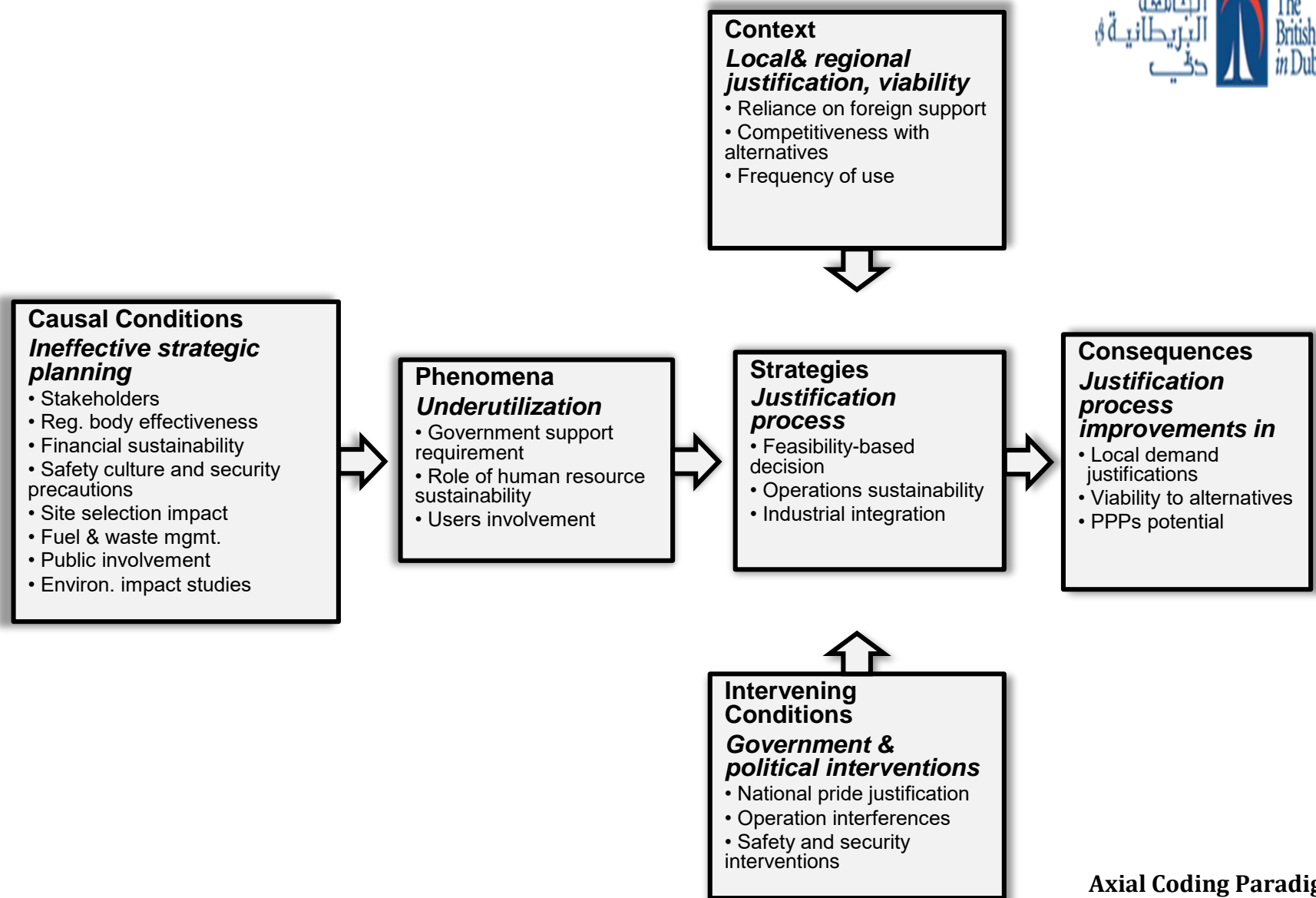
- Ten interviews were consecutively conducted with senior researchers and practitioners in the research reactors industry, until sufficient data was collected.
- The semi-structured interviews were transcribed and imported into the NVIVO software.



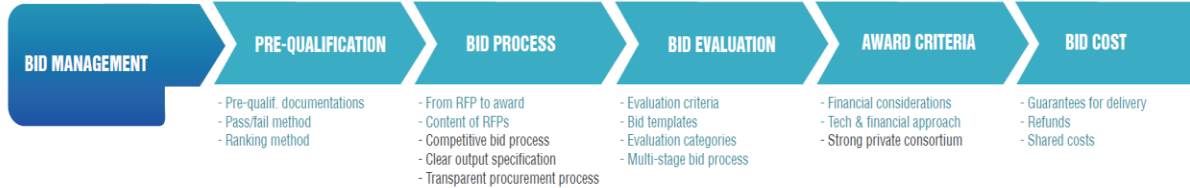
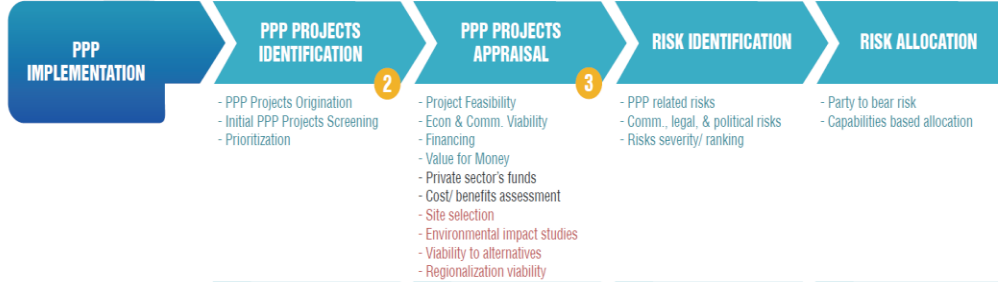
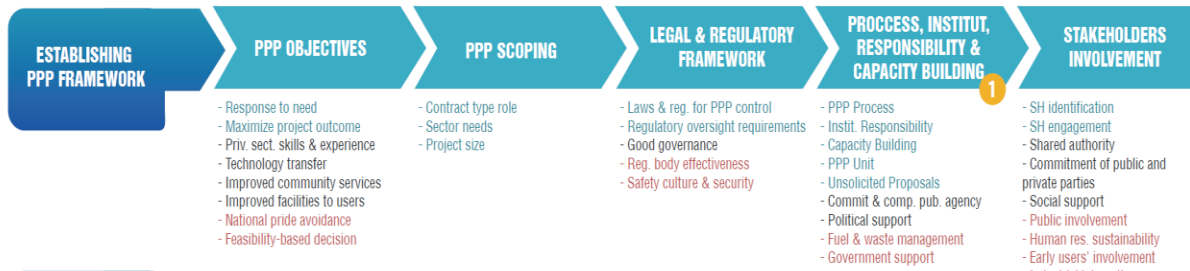
Coding Map



Comparison Tree



Axial Coding Paradigm



- Public party responsibilities
 - Private party responsibilities
 - Development procedures
 - Institutions role
 - Approval procedures
 - PPP development capacity
 - Roles of the PPP Unit
 - Unsolicited proposals mechanism
- Planning gap, or policy reasons for origination
 - Legal and technical compatibility
 - Prioritization criteria
 - Resources allocations
- Technical feasibility
 - Legal feasibility
 - Environmental & social impact studies
 - Economic viability study
 - Commercial viability study
 - Equity/ Debt financing
 - Corporate or Project Debt
 - Value for money approaches
- PPP company duties
 - Output performance indicators
 - Value for money compliance

UAE PPP ATTRACTIVE, VFM & CSFS

- PPP attractive factors groups**
 - Cost savings
 - Value for money
 - Risk transfer to private party
 - Cost and time control
 - Long-term engagement
 - Large size of projects
 - Priv. sec. skills & experience
 - Benefits to the public sector**
 - Capacity building
 - Economic growth
 - Benefits to the end users**
 - Private sector's funds
 - Cap service cost
 - Economic & technical benefits**
 - Stimulate financial market
 - Boost resources & experience
- Value for money factors groups**
 - Optimis. of assets efficiency
 - Optimised risk allocation
 - Technical innovation
 - Clear output specification
 - Low life-cycle cost
 - Competitive bid process
 - Project sustainability**
 - Reduced neg. environ. impact
 - Efficient dispute resolutions
 - Early service delivery
 - Private party's contribution**
 - Incentives for private party
 - Long-term engagement
 - The private sector's PM skills
 - Benefits to the end users**
 - Improved services to community
 - Improved facilities to the users
 - Low tariffs
 - Appropriate capital structure
- Critical success factors groups**
 - Project feasibility**
 - Local financial market
 - Macro-economic conditions
 - Multi-benefit objectives
 - Project technical feasibility
 - Effective bid management**
 - Commit & compl. Pub. agency
 - Competitive procurement
 - Favourable local conditions**
 - Favourable legal framework
 - Political support
 - Social support
 - Commit. Pub. & priv. parties**
 - Transparent procurement
 - Commitment of parties
 - Government involvement
 - Appropriate risk allocation
 - Government guarantees
 - Project delivery**
 - Clear cost/ benef. assessment
 - Strong private consortium
 - Effective leadership**
 - Shared authority
 - Sound economic policy

RR CSFS	FUTURE DEMAND	JUSTIFICATION PROCESS EFFECTIVENESS	GOV. & POLITICAL INTERVENTIONS	INEFFECTIVE PROJECT INITIATION WORK	UNDERUTILISATION	LOCAL CONTEXT	REGIONAL COLLABORATIONS
	<ul style="list-style-type: none"> - Usefulness of research reactors - Availability of alternatives - Reliance of nuclear industry on RRs 	<ul style="list-style-type: none"> - Feasibility-based decision - Operations sustainability - Users integration 	<ul style="list-style-type: none"> - National pride justification - Operation interferences - Safety & security interventions 	<ul style="list-style-type: none"> - Stakeholders' importance - Regulatory body effectiveness - Financial sustainability - Business plan thoroughness - Government support 	<ul style="list-style-type: none"> - Users involvement - Governmental support requirement - Human resource sustainability 	<ul style="list-style-type: none"> - Reliance on foreign support - Viability to alternatives - Frequency of utilisation 	<ul style="list-style-type: none"> - Impact of politics on regional RRs - The significance of national pride - Regionalization impact on utilisation

Conclusion

- Through the constant refinement of the relationships in this study, the following propositions (relationships) were generated:

Intervening proposition

- Government and political interventions alter the value of the justification process and influence directly the utilization and subsequently, the potential for users' integration in research reactors.
- Government and political interventions include national pride justifications, operations interferences, and safety and security measures.

Conclusion

Contextual proposition

- The proper utilization of research reactors depends on the influence of local and regional justifications and on the outcomes of the project initiation work.
- Local and regional justifications include local demand justifications, viability of other alternatives, and partnership potential.

Conclusion

Strategies proposition

- The strategies in response to the justification process that influence the utilization of research reactors are expected to address the issues of feasibility-based decisions, sustainability of operations, and industrial integration.

Conclusion

- The contributions of this research to the body of knowledge is that this study considered the underutilization phenomenon of research reactors and identified the critical conditions influencing such phenomenon to improve the operations of research reactors.
- Such conditions could be scrutinized further as identified constructs that are rigorously substantiated by theory.

THANK YOU!