



**DECISION
FRAMEWORKS**

**From chaos to
clarity.**

**Dynamic Framing
for Strategic Games
in Biopharma**

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Agenda

- ▶ **Game theory: what it is and when to use it**
- ▶ **Strategic Gaming and Dynamic Framing**
- ▶ **Case illustration**
- ▶ **Closing thoughts, Q&A**

Game theory: not a theory, nor is it about playing games

A tool to analyze interdependent situations

- **Should we compete or cooperate, and how?**
- **Provides a logical and clear structure**
- **Helps predict and prescribe optimal strategic behavior**

Learning Potential	Yes	Decision Theory (with options)	Game Theory
	No	Decision Theory	Game Theory
		No	Yes
		Influence Potential	

So, where can game theory add value in biopharma?



Making game theory practical: Strategic Gaming



The approach focuses on 5 questions:

1. Players
2. Choices
3. Sequence
4. Uncertainties
5. Payoffs

Strategic Gaming Dynamic Framing Workflow

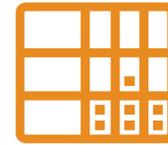
Define



Decision Maker
Input



Situational
Analysis



Players List



Game
Scoping



Frame



Game
Timeline



Game Trees



Qualitative
Assessment



Influence
Diagram

Case: Nash is a growing, midsize pharma company at a crossroads

- ▶ **Phase 2 results soon for a potential blockbuster**
- ▶ **Prince and Mars are the potential partners**
 - ▶ **Cannibalization risks with Prince, who has a competing drug in phase 2**
- ▶ **Key questions:**
 - ▶ **Make a deal?**
 - ▶ **Now or after phase 2?**
 - ▶ **Deal terms?**
 - ▶ **Go alone and build a sales force?**

Case Definition

Decision Problem Statement

Who should Nash make a licensing deal with and when, or should it build its own sales force to market its new drug?

Driver for a decision at this time

Nash has a new drug compound that, in Stage 1 trials, has been shown to be highly promising. Has some bad experience with out licensing, and has grown to be a midsize company so it is considering the potential for building its own sales force.

Values/Decision criteria to select the strategy

- *Realizing value for the drug*
- *Future marketing capabilities*

Givens/decisions made which set the problem scope

- *Potential licensing deals will be with either Prince Pharmaceuticals or Mars Medical*
- *Prince has a similar drug that could launch around the same time but is a better marketer*
- *Potential licensing terms narrowed to a large upfront payment and smaller royalty, and the opposite*

Key questions the decision evaluation needs to answer

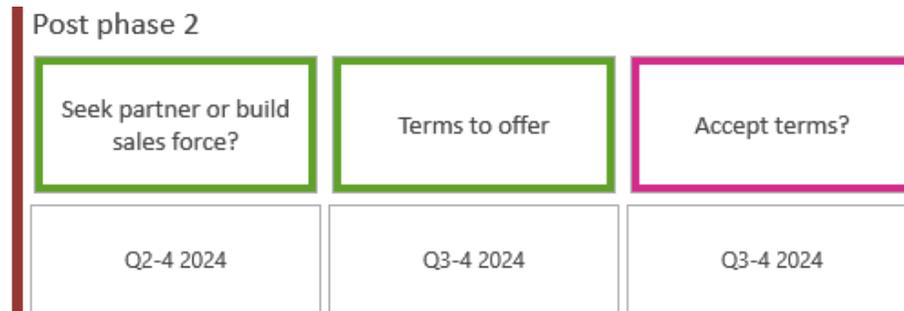
- *Should Nash make a deal before phase 2 trials or wait?*
- *Should Nash build up its own sales force?*
- *What type of deal will be a win-win that brings Nash the most possible value?*
- *What leverage does Nash have? What tactics will be most effective?*

A game timeline helps lay out the sequence of interactions and resolution of key uncertainties

Now



If no deal prior to phase 2 results

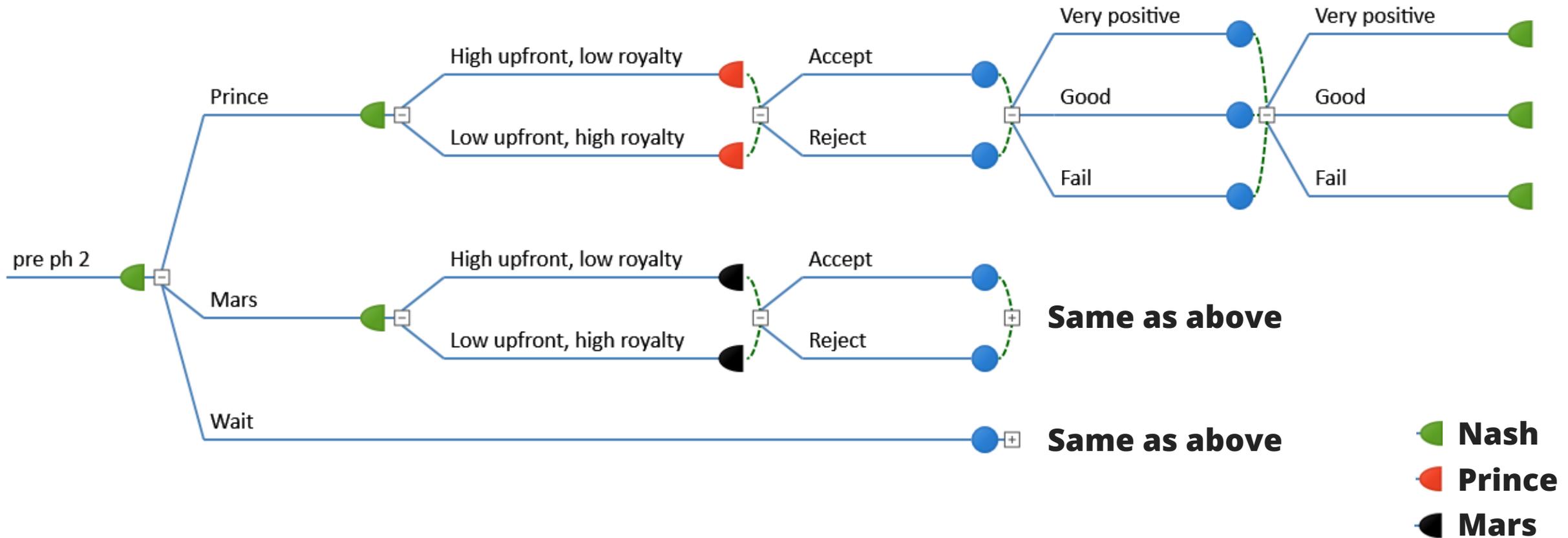


With a deal or not...



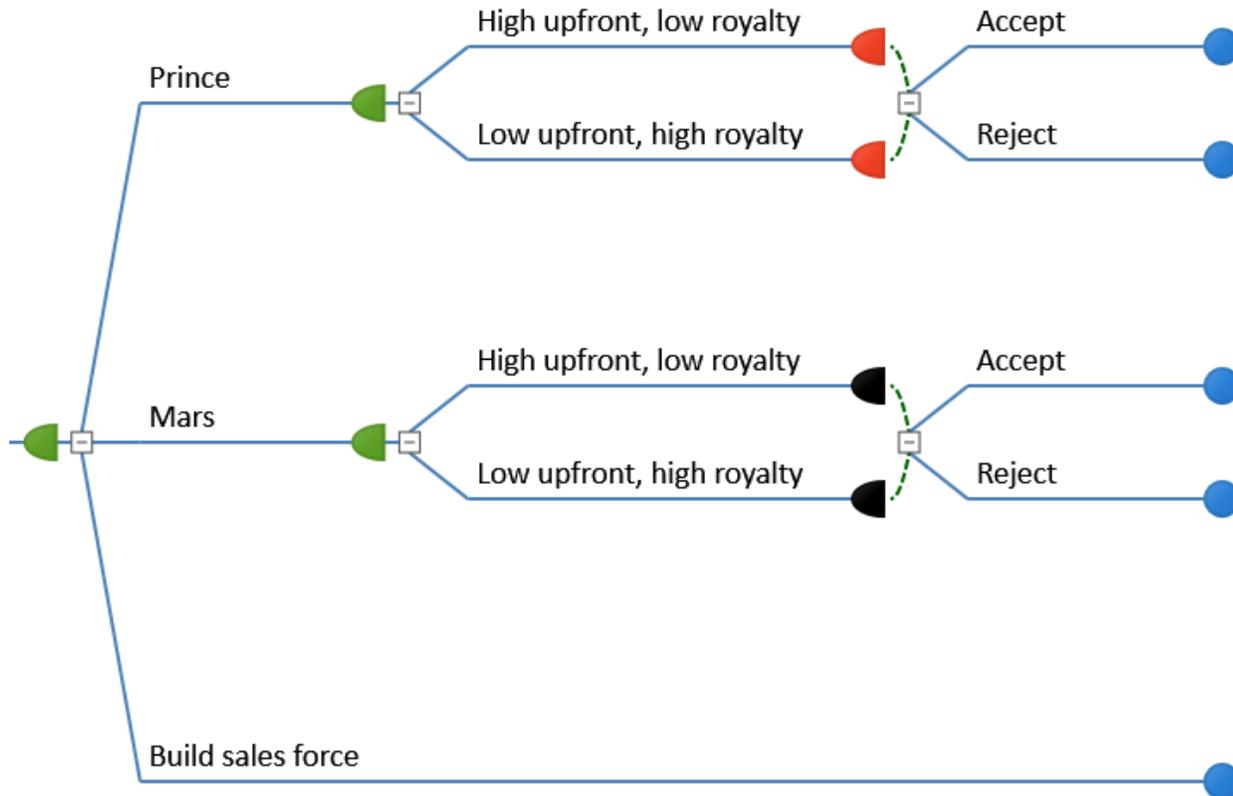
A simple tree structures the first phase of the game

Level 1	Nash partner target	Nash offer	Prince/Mars response	Prince ph 2 results	Nash ph 2 results
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If no deal was made prior to phase 2 results, waiting is no longer an option for Nash

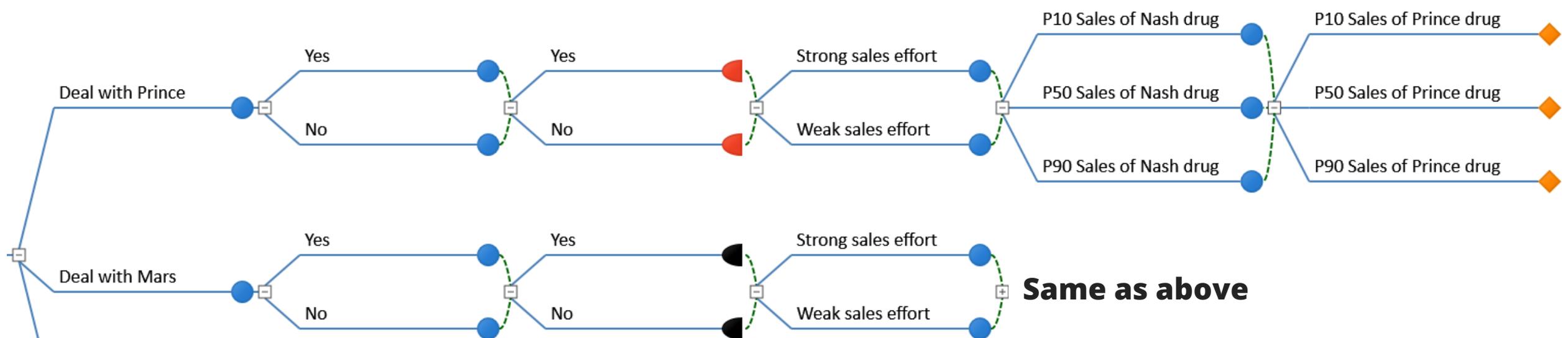
Nash partner target	Nash offer	Prince/Mars response
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-  **Nash**
-  **Prince**
-  **Mars**

After a deal is made or Nash decides to build a sales force, key uncertainties get resolved and cannibalization may be a key choice

Result of Nash approach	Nash ph 3/FDA approval	Prince ph 3/FDA approval	Prince/Mars sales effort	Sales of Nash drug	Sales of Prince drug
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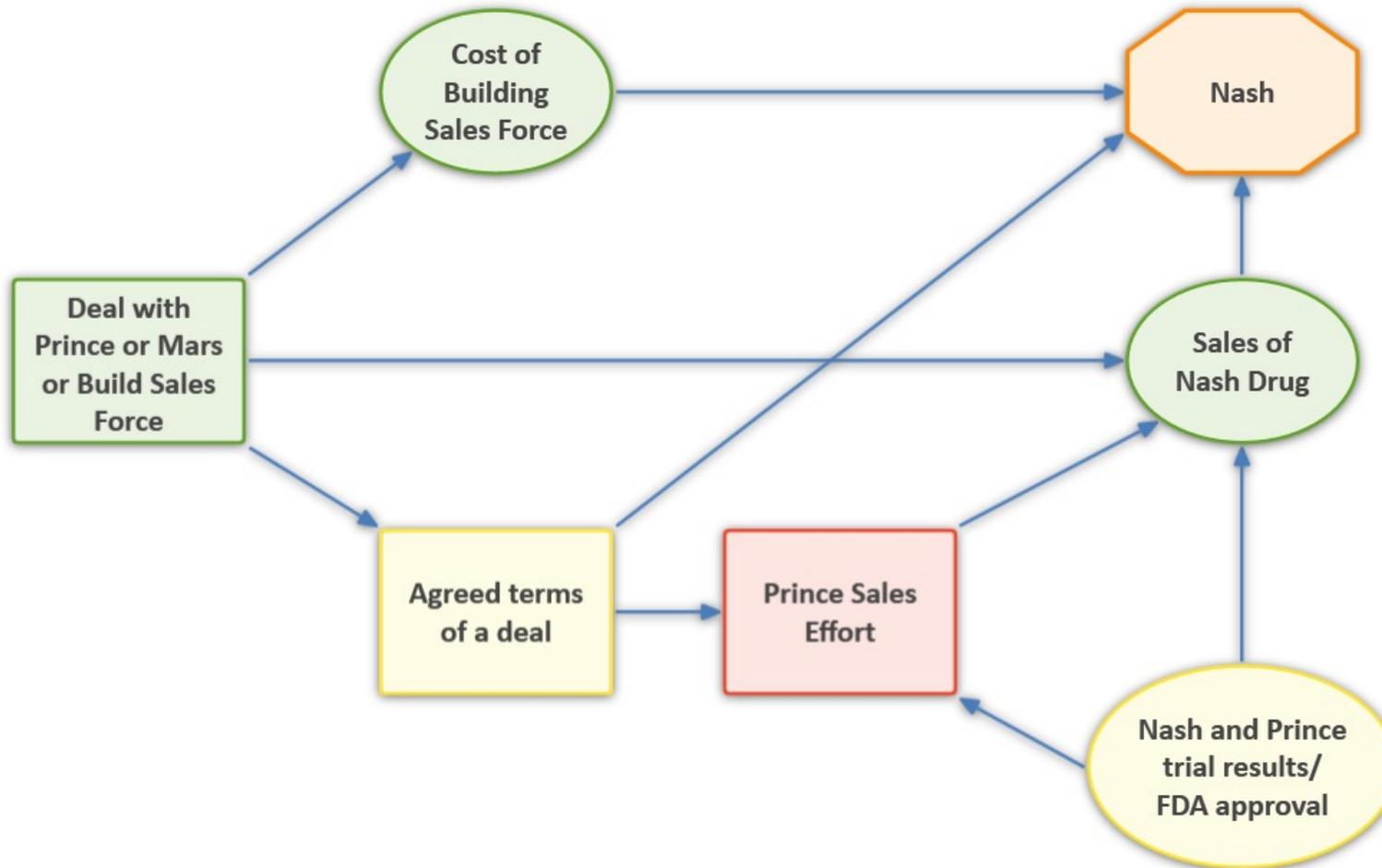


Same as above

Same as above

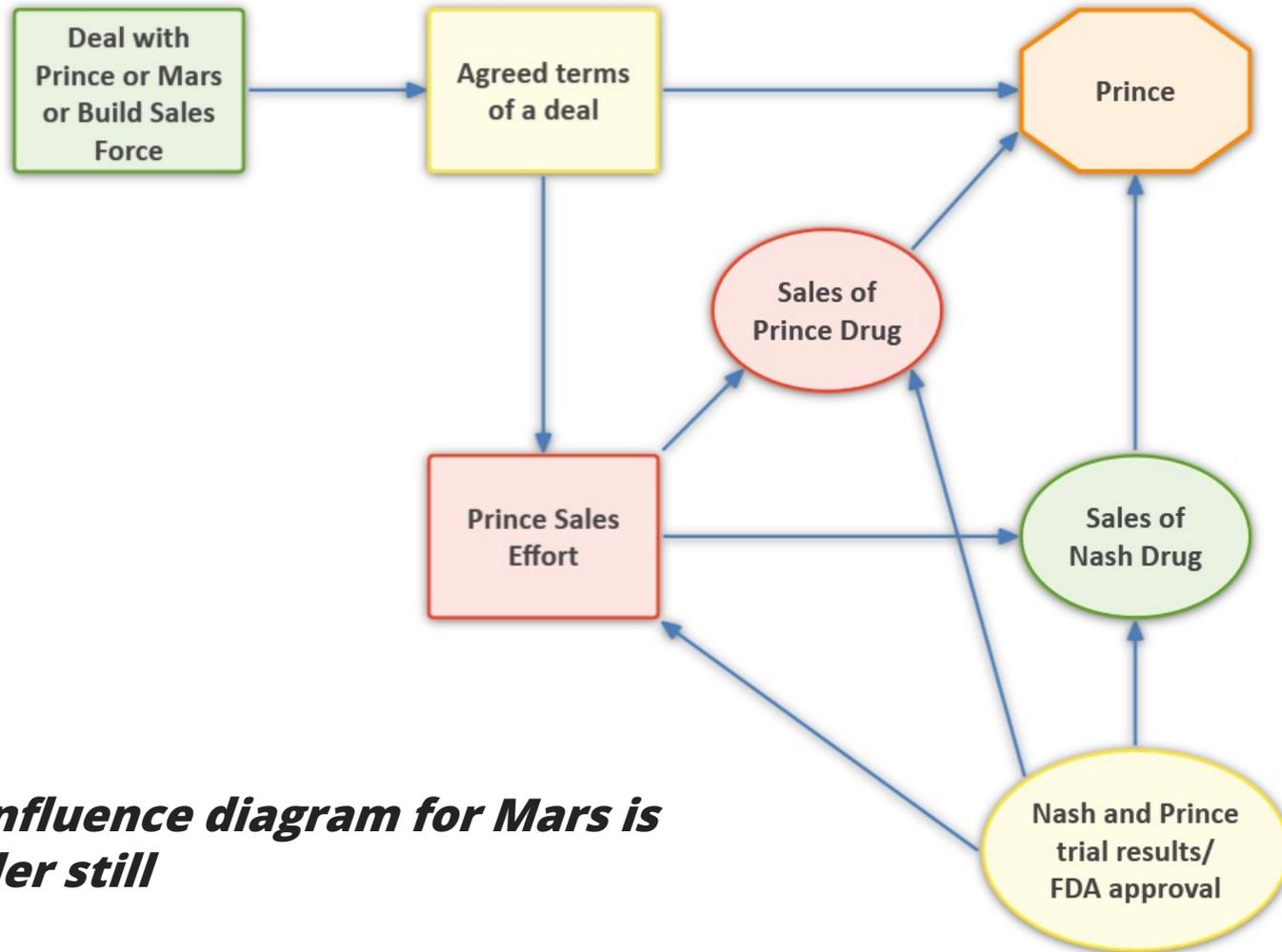
- Nash**
- Prince**
- Mars**

For evaluation, a big tree can be simplified significantly but we need a model from each player's perspective



- Nash
- Prince
- Multiple parties

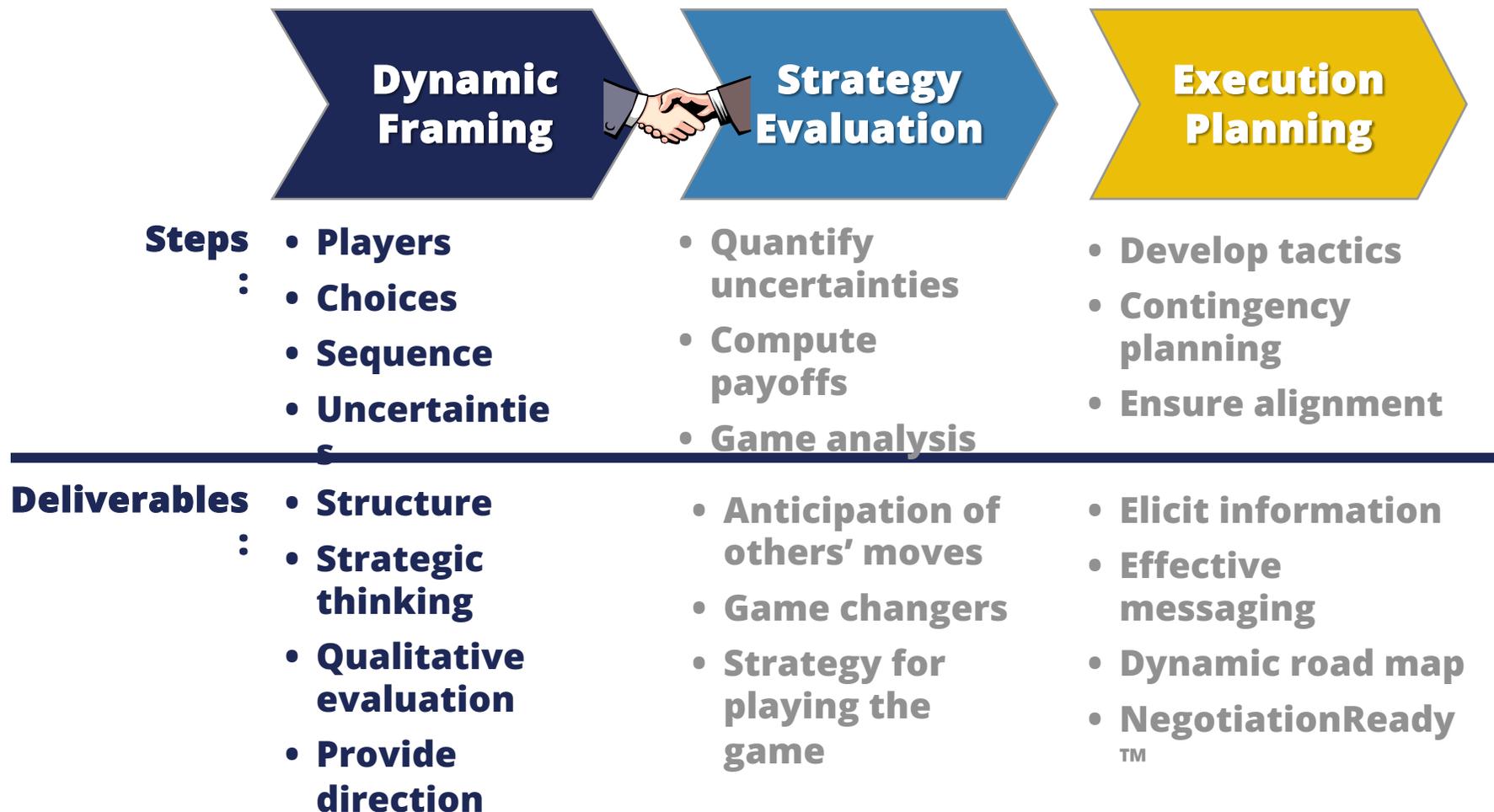
Prince's influence diagram is similarly straightforward



The influence diagram for Mars is simpler still

- Nash
- Prince
- Multiple parties

This case required quantitative work and a detailed action plan





Closing thoughts and Q&A

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