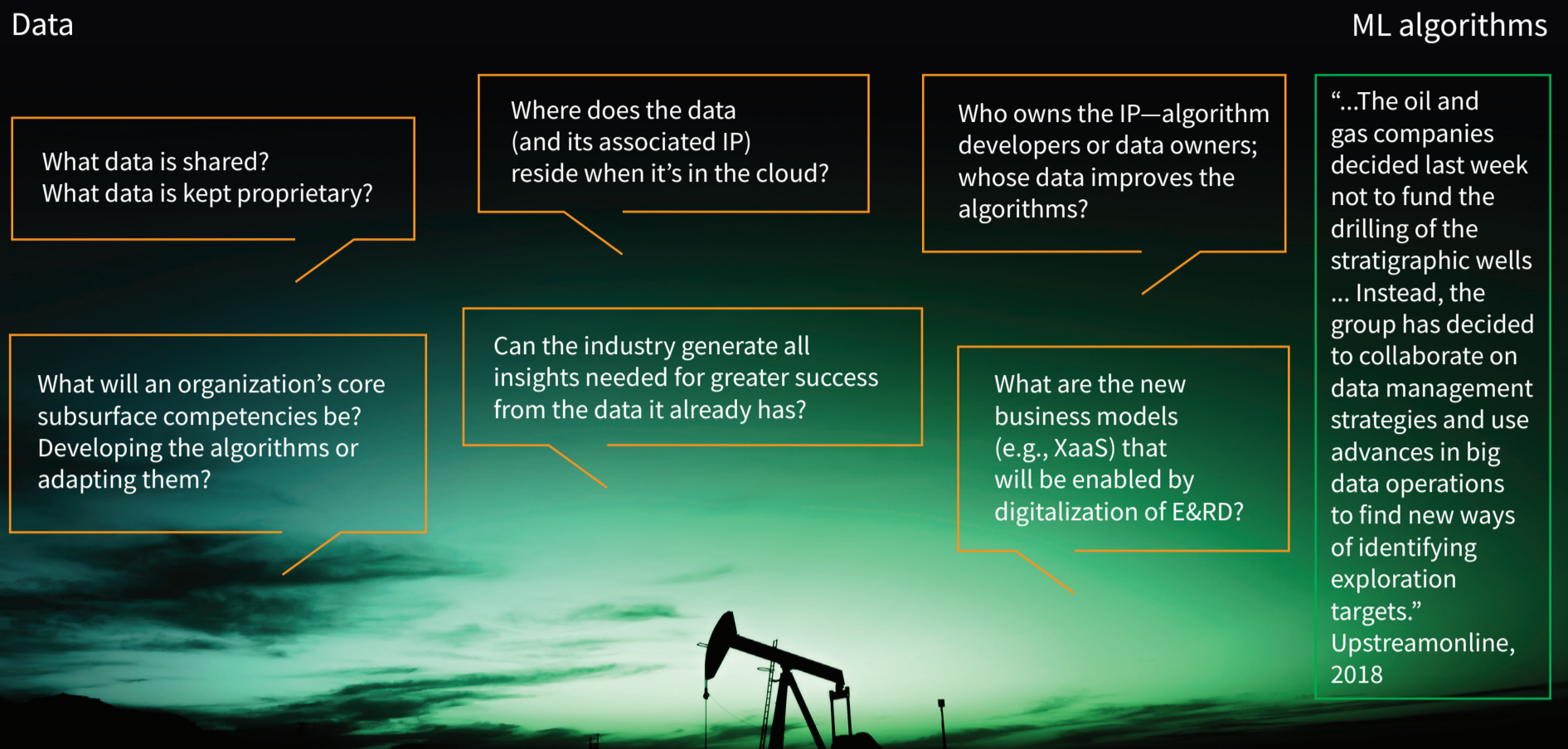
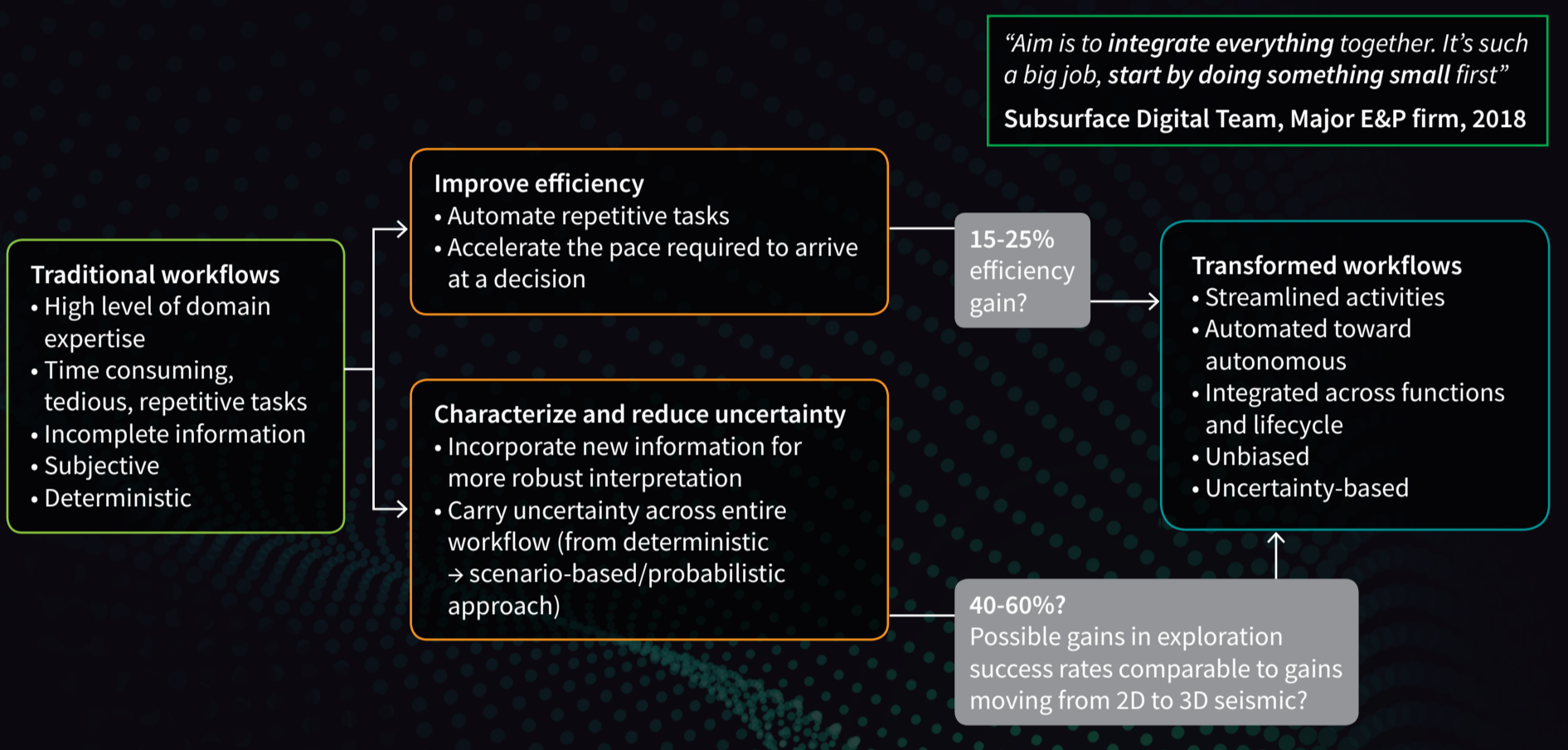


Digitalization of Exploration and Resource Development

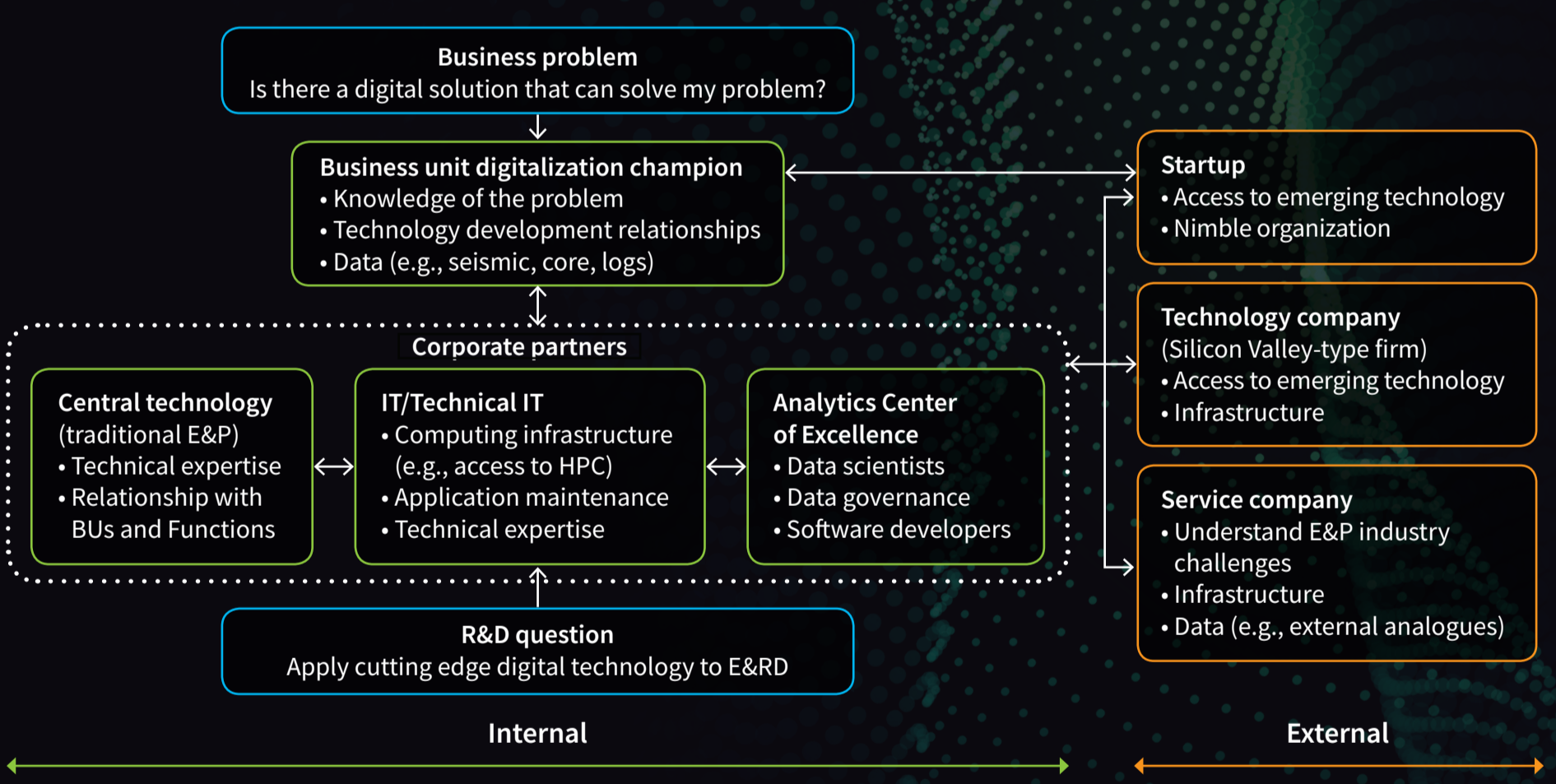
Questions driving the future direction of the digitalization of E&RD



Industry progression toward digitalization of E&RD



Organizational elements supporting digitalization of E&RD



Upstream digitalization models

Comparative characteristic	Digitalization model			
	“Big bet”	“Functions take the lead”	“Business takes the lead”	“Existential crisis”
Key aspects	<ul style="list-style-type: none"> • \$100 million+, corporate-wide investments • Holistic vision, while targeting “quick wins” • More apt to partner (e.g., Equinor-Accenture) 	<ul style="list-style-type: none"> • Discrete functions drive advances (e.g., Drilling, Reservoir Management) • Light integration underway (e.g., formation of corporate Digital Transformation and Industrial Revolution 4.0 groups) 	<ul style="list-style-type: none"> • Operating units drive advances (e.g., Gulf of Mexico, Deepwater, Australia LNG) • Focus on 1) specific “pain points” and opportunities, and 2) integration across standalone assets 	<ul style="list-style-type: none"> • Extreme cost pressure drives focus on immediate benefits in discrete areas (e.g., artificial lift, drilling) • Forgo partnerships in competitive-differentiating areas • Integrate into broader innovation programs (“the new R&D organization”)
Example E&P firms*	BP, Eni, Equinor, Petrobras, Petronas, Woodside	Chevron, ExxonMobil, Saudi Aramco	ConocoPhillips, Shell	Independents (Anadarko, Devon, EOG, Oxy, Pioneer, Santos)
Organizational positioning	CEO (Corporation, or upstream division)	Functional lead (e.g., EVP Wells, President production company)	Business unit leadership	Regional president, COO, CTO, CIO
Organizational value realized, to date	Low-to-moderate	Moderate	Low-to-moderate	Moderate-to-high

*E&P firms may be hybrids and not fall exclusively into a single digitalization model.