

# Overlooked— The First Step of Innovation

Oct 10, 2019

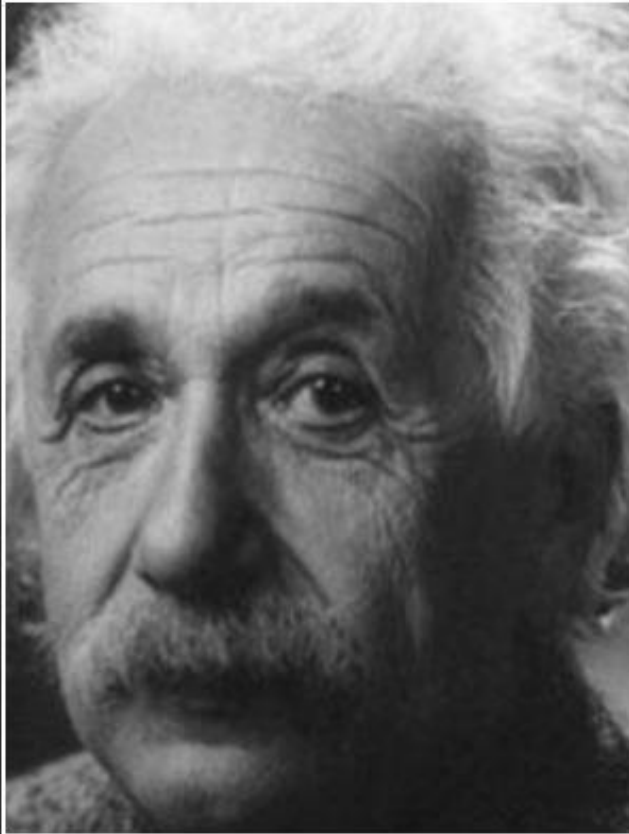
Presented by Ben Graham and Kevin Li

The Problem Lab



UNIVERSITY OF  
**WATERLOO**

The Problem Lab's sole mandate is to find and understand important problems.



If I had an hour to solve a problem  
I'd spend 55 minutes thinking about  
the problem and 5 minutes thinking  
about solutions.

— *Albert Einstein* —

AZ QUOTES

BCG

THE BOSTON CONSULTING GROUP

TUM

# The Mix That Matters

*Innovation Through Diversity*









Lorenzo, R., Voigt, N., Schetelig, K., Zawadzki, A., Welp, I.M. & Brosi, P. (2017, Apr). The mix that matters – Innovation through diversity. *The Boston Consulting Group and the Technical University of Munich.*

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## EXHIBIT 2 | The Four Types of Diversity That Bolster Innovation—And Two That Don't

DIVERSITY DIMENSION		RELATIONSHIP TO INNOVATION	
		Direction of relationship	Statistical significance of relationship
	Industry background	↑	Very high
	Country of origin	↑	Very high
	Career path	↑	Very high
	Gender	↑	High
	Academic background	~	None
	Age	↓	High

↑ Positive significant relationship      ↓ Negative significant relationship  
 ~ No significant relationship

Source: 2016 survey of German, Swiss, and Austrian companies by BCG and Technical University of Munich.  
 Note: Innovation = the percentage of revenue from new products or services in the most recent three-year period. Very high statistical significance = a p value <0.01. High statistical significance = a p value <0.05.

Lorenzo, R., Voigt, N., Schetelig, K., Zawadzki, A., Welpel, I.M. & Brosi, P. (2017, Apr). The mix that matters – Innovation through diversity. *The Boston Consulting Group and the Technical University of Munich*.

“Up to 41% of big companies’ variation in innovation can be explained by the diversity of industry backgrounds or career paths of their managers.”

Lorenzo, R., Voigt, N., Schetelig, K., Zawadzki, A., Welpel, I.M. & Brosi, P. (2017, Apr). The mix that matters – Innovation through diversity. *The Boston Consulting Group and the Technical University of Munich.*

# Defence Procurement

Four procurement options:

Develop innovative products domestically

Adapt existing products 

Develop products with international partnerships

Acquire new products from international firms

Canada First: Leveraging Defence Procurement Through Key Industrial Capabilities. (2013).

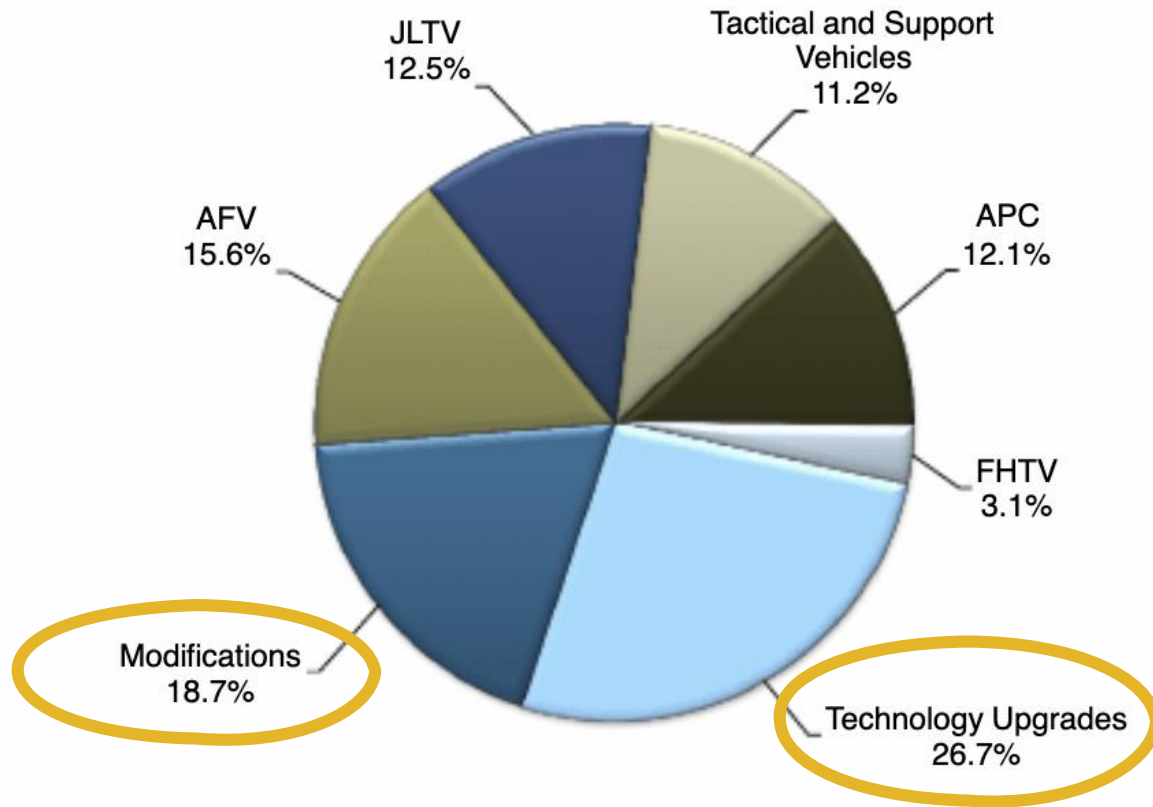
# Defence Procurement

Adapt existing products ←

Represents significant amount of combat vehicle spending



## Total Military CV Market: Percent Spending by Segment, US, 2018



Note: All figures are rounded. The base year is 2018. Source: DoD; Frost & Sullivan

US Combat Vehicle Market, Forecast to 2024. (2019). Frost & Sullivan.

# Defence Procurement

## The challenge ahead

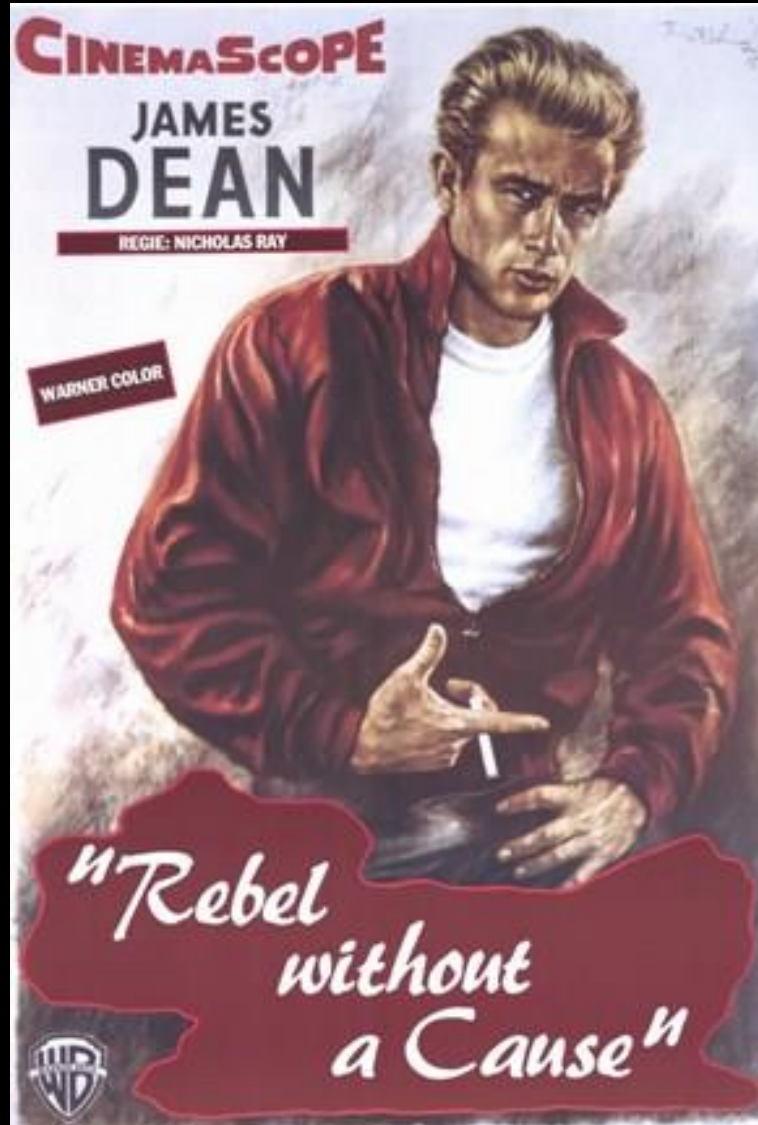
### Current and Future Vulnerabilities to US Military Installations

Service	# Installations	Recurrent Flooding		Drought		Desertification		Wildfires		Thawing Permafrost	
		Current	Potential	Current	Potential	Current	Potential	Current	Potential	Current	Potential
Air Force	36	20	25	20	22	4	4	32	32	-	-
Army	21	15	17	5	5	2	2	4	4	1	1
Navy	18	16	16	18	18	-	-	-	7	-	-
DLA	2	2	2	-	2	-	-	-	-	-	-
DFAS	1	-	-	-	1	-	-	-	-	-	-
WHS	1	-	-	-	-	-	-	-	-	-	-
<b>Totals</b>	<b>79</b>	<b>53</b>	<b>60</b>	<b>43</b>	<b>48</b>	<b>6</b>	<b>6</b>	<b>36</b>	<b>43</b>	<b>1</b>	<b>1</b>

Report on Effects of a Changing Climate to the Department of Defense. (2019). USA Department of Defence.

# “The N-Word”

McRobbie, D., Moore, E., Graves, M. & Prince, M. (2006). MRI From Picture to Proton, second edition.

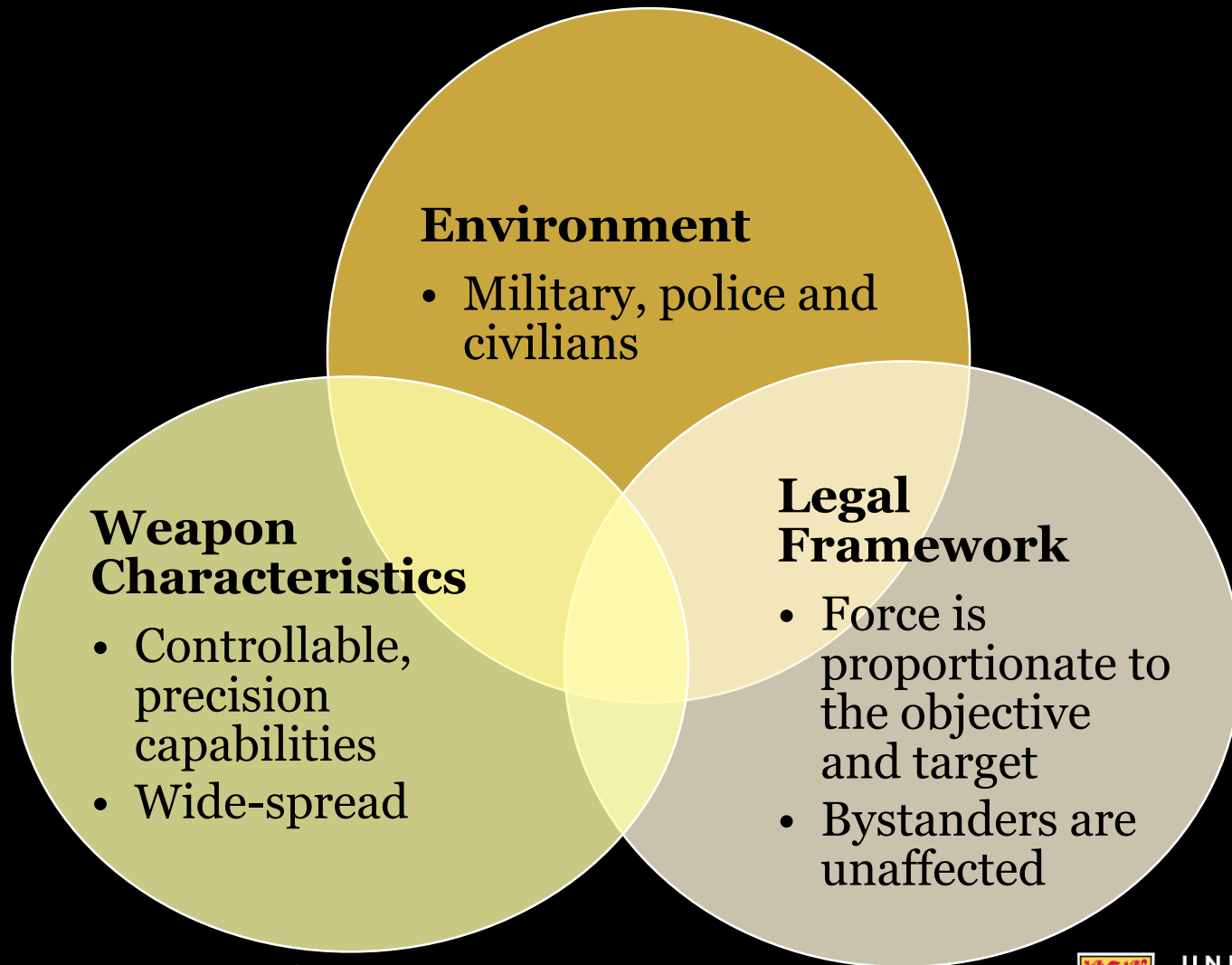




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# Non-lethal Force Technologies



# Non-lethal Force Technologies

## Active Denial System



Source: Wired



U.S. Marine Corps photo by Lance Cpl. Andrew M. Huff

# Non-lethal Force Technologies

## Active Denial System

- Deployed in Afghanistan in 2008
- Inflexible and withdrawn in 2010

Environments reduce energy power levels

Researchers “found a wide safety margin between the desired repel response and injuries.”

Source: Kenny, J, Ziskin, M., Adair, B., Murray, B., Farrer, D., Marks, L. & Bovberg, V. (2008). A Narrative Summary and Independent Assessment of the Active Denial System. Penn State Applied Research Laboratory.



U.S. Marine Corps photo by Lance Cpl. Andrew M. Huff



# Common Problem-Solving Pitfalls

Flawed Problem  
Definition

Solution  
Confirmation

Wrong Framework

Narrow Problem  
Framing

Miscommunication

Garrette, B., Sibony, O. & Phelps, C. (2018). The Five Pitfalls Of Problem-Solving - And How To Avoid Them. Forbes.

# Q&A

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<https://uwaterloo.ca/problem-lab/>