



*The use of **FATE*** for illuminating disruptions*

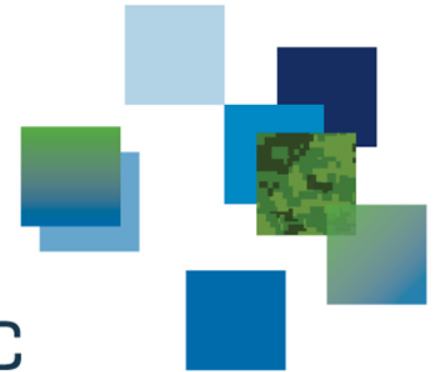
*(*Futures Assessed alongside **socio**-Technical Evolutions)*

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G Adlakha-Hutcheon#, K. Bown, A Lindberg, TG Nielsen, S Roemer and JF Maltby

Dr. Gitanjali Adlakha-Hutcheon
Chair, NATO Research Task Group SAS-123
Defence R&D Canada



DRDC | RDDC

Outline

- *FATE* – The method
- Two STS in two different operations
- *FATE* is unique because
- *FATE* invites exploitation

????

- When was the last time you formally addressed a client's question on a technology from the perspective of a holistic system? One that looks at drivers and resistors of a socio-technical system that may impact the evolution of a technology?
- FATE does this !
- How?

FATE ?

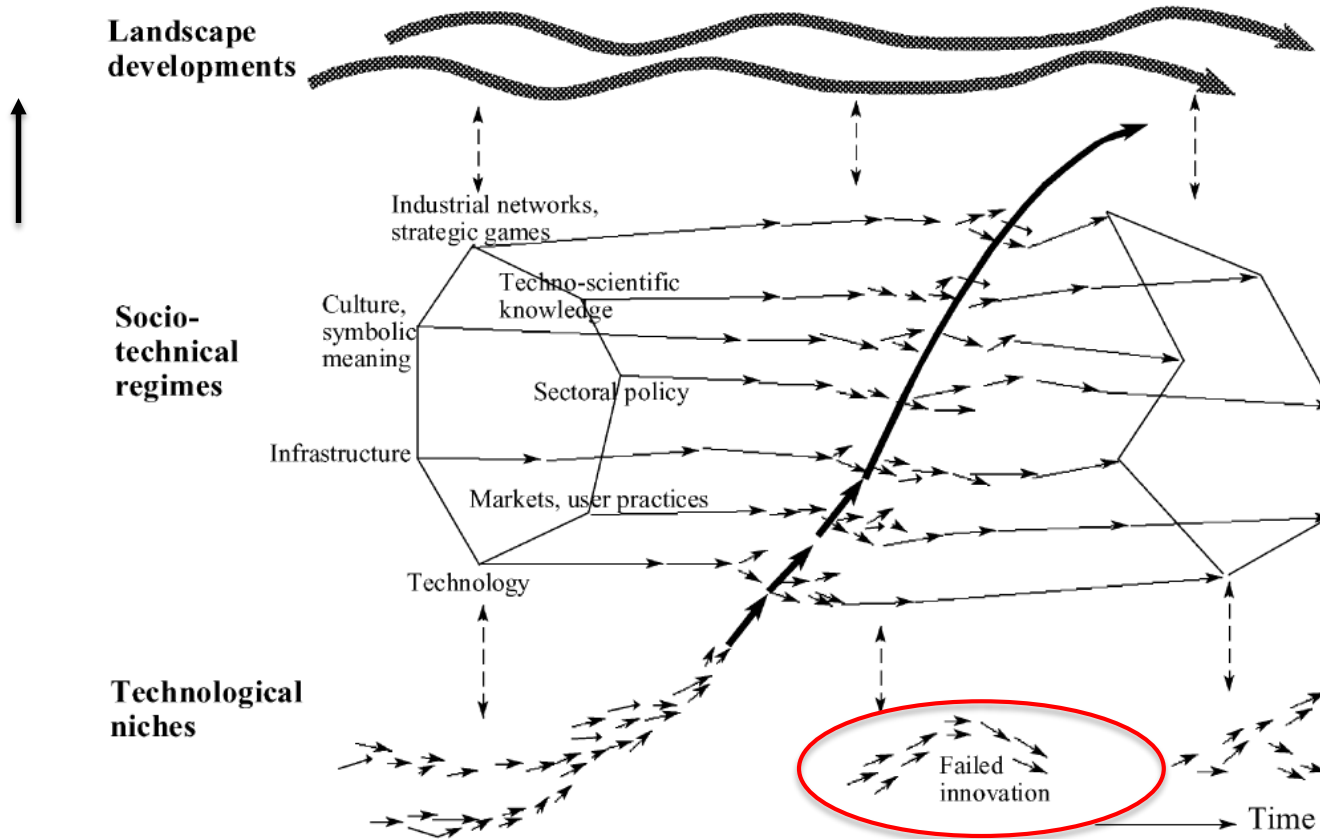


The idea:

FATE – a means to conduct:

A concurrent assessment of **socio-technical** systems within imagined future scenarios

Excursion: Socio-technical transitions



The *FATE* Method

A problem – scope it as a Socio-Technical System (STS)

■ Step 1 – Socio-Technical System (STS)

Elaborate STS in to Niche, Regime and Landscape levels keeping the *OPPPTI** ontology in mind

■ Step 2 – Future scenario

Adapt a scenario into *TEMPLES*# if required

■ Step 3 – Interactions between future scenario and STS

3.1 How do you see the STS evolving?

3.2 How do you see the STS in the described future scenarios?

Output: personal, group insights, drivers and resisters (D and R) for scenarios from baseline STS in relation to *TEMPLES* derived from future Scenarios

■ Step 4 – Relevance for Defence and Security

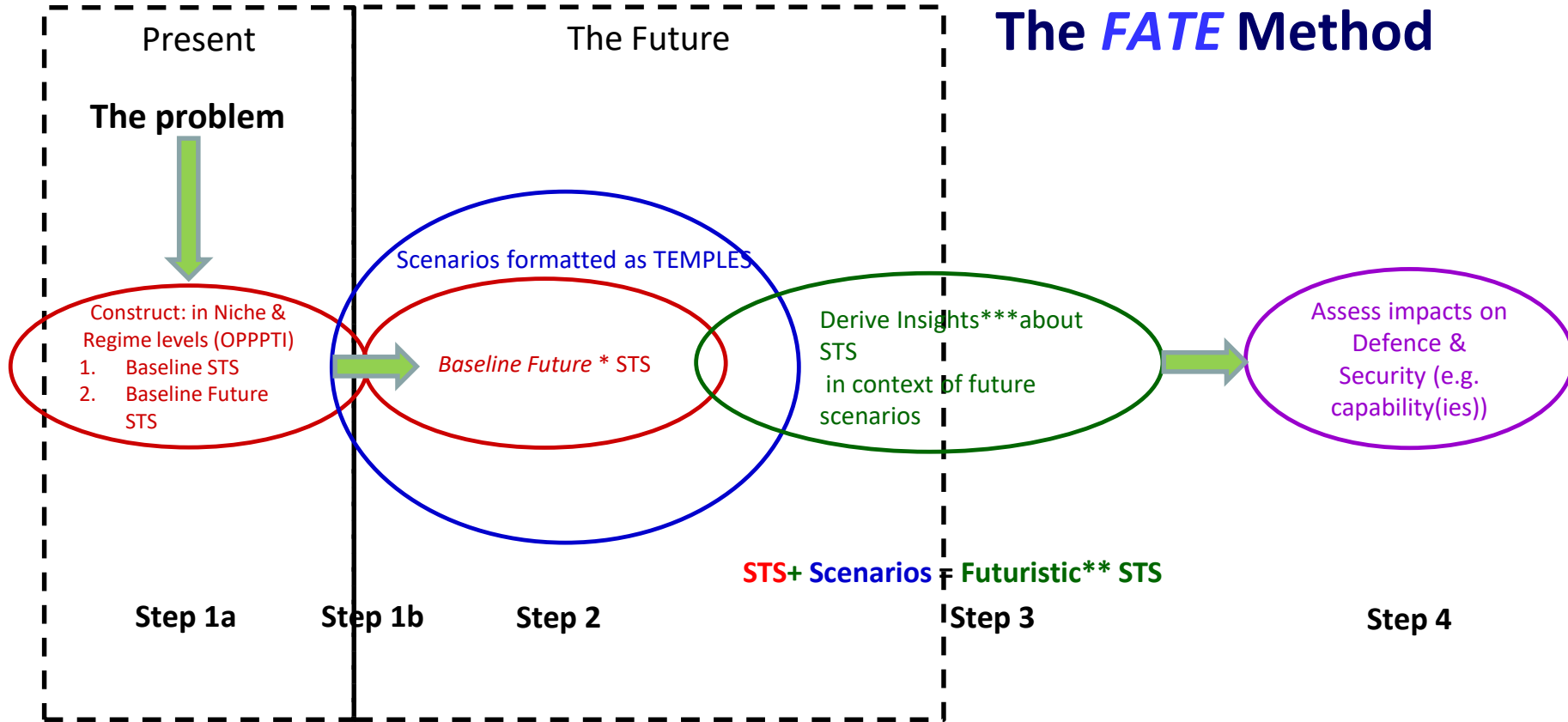
Assess the impact on defence and security e.g. wrt capabilities

Output: Impact mitigation options for client questions from at least two scenarios

TEMPLES – Technological, Economical, Military, Political, Legal, Environmental and Social

* *OPPPTI* – Organization, People, Processes, Policies, Technology, Infrastructure

The *FATE* Method



*Baseline Future STS is an idealised *extrapolation* of the Baseline STS done intuitively from what is emerging today, scenario agnostic

**Futuristic STS derived from the changes in STS upon interaction with future scenario(s)

***Insights from analysis, changes in STS, drivers and resistors of change in context of future scenarios

FATE – in action with examples

Step 1 – Socio-Technical System (STS)

■ Elaborate STS in to the Multilayer Perspective

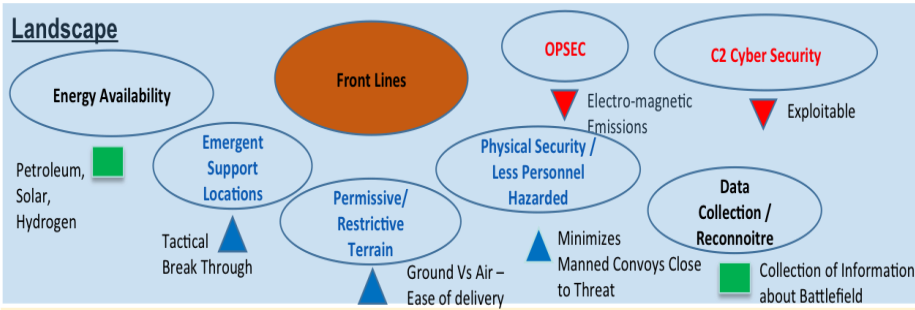
- Niche, Regime and when needed Landscape levels, and then into
- OPPPTI ontology
(OPPPTI - Organization, People, Processes, Policies, Technology, Infrastructure)

■ Two STS examples:

- What is the impact of delivery to front lines by **autonomous** means?
- Traditional operations,
- Automated delivery adds a contemporary flavor,
- Reducing number of soldiers in harms way.
- How could '**wearables**' effect urban operations?
- Urban operations,
- Contemporary equipment used to collect data facilitating near real time decision making,
- Minimizing risks for both soldiers and civilians.

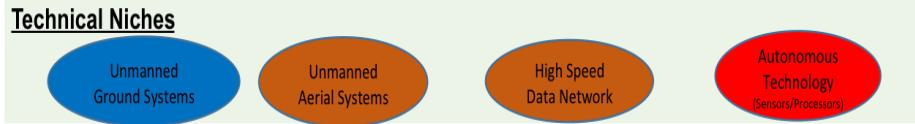
Examples of Two STS

- Delivery to front lines by **autonomous** means

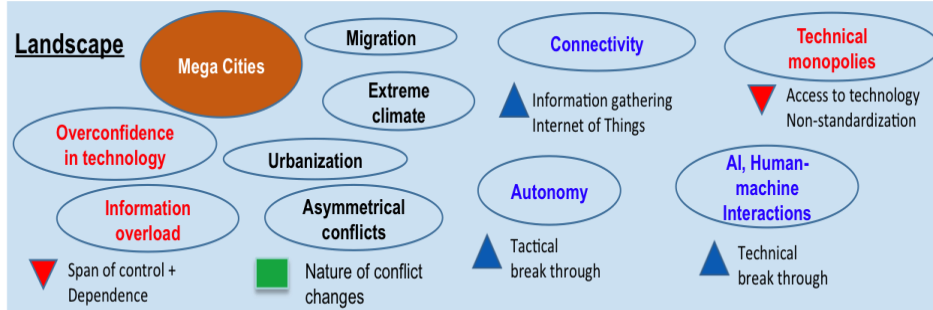


Regimes

Organizations	People	Technology	Infrastructure
<ul style="list-style-type: none"> • Armies <ul style="list-style-type: none"> • Cultural Norms • Existing Doctrine • Needs • Wants • Commercial Industry • Manufacturers 	<ul style="list-style-type: none"> • Commanders <ul style="list-style-type: none"> • Innovators • Biases • Understanding • Forward Units (Infantry, Tanks, etc) • Logisticians • Mechanics (Training Challenges) 	<ul style="list-style-type: none"> • Sensor Prolif (Wright's Law) <ul style="list-style-type: none"> • LIDAR • Cameras • Marsupial Capabilities <ul style="list-style-type: none"> • Technology • Sea to Land • Land to Air • Battery Technology • Electric = Quiet; Petroleum = Loud 	<ul style="list-style-type: none"> • Roads • Landing Points • Automated Resupply Nodes • Expeditionary <ul style="list-style-type: none"> • Rapid Charging/ Refuel Capability • Data Networks

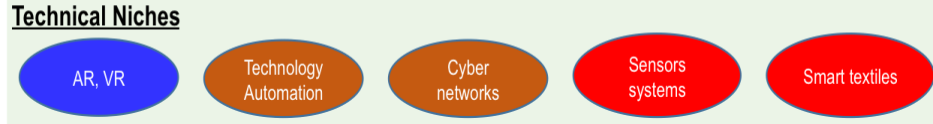


- How could **wearables** effect urban operations?



Regimes



Organizations	People	Technology	Infrastructure
<ul style="list-style-type: none"> • Dispersed armies <ul style="list-style-type: none"> • New doctrines • Tech. challenges • Wants • Tech Monopoly • Commercialization • Big companies <ul style="list-style-type: none"> • Power to development • Access to tech • Needs 	<ul style="list-style-type: none"> • Social hierarchies <ul style="list-style-type: none"> • Changing structures • Self-governed • Trust in authorities variable • Spearheaded education/ knowledge • Legal framework <ul style="list-style-type: none"> • Changing norms • Perspectives 	<ul style="list-style-type: none"> • Widespread <ul style="list-style-type: none"> • High level of accept • Integration • Autonomy • Private sect innovation • Quantity of information <ul style="list-style-type: none"> • Slight distrusted • Quality of data 	<ul style="list-style-type: none"> • Networks everywhere <ul style="list-style-type: none"> • Accessibility • Secrecy • Closed combat zones <ul style="list-style-type: none"> • Tech depended • Security • Demand driven needs



Step 2 - Future scenarios

- *FATE* uses pre-described states of the world (“scenarios”)
- Scenario characteristics are explored using the TEMPLES (Technological, Economical, Military, Political, Legal, Environmental and Social) scheme
- Example used for future scenarios are Future worlds™ (FW)
 - FW differentiated along 3 axes:
 - Global power dynamics
 - State control
 - Resource sustainment
 - FW4 and FW5 are an example for a pair of future worlds with pronounced differences for each of the 3 axes

Step 2 – Characteristics of FW4 and FW5

TEMPLES	<p>Future World 4</p> 	<p>Future World 5</p> 
<i>Technological</i>	<p>-Innovation is driven by the military sector. Positive drivers for technological growth pervasive presence in main aspects of life (transport, work, networking...)</p>	<p>-Technology is flourishing and is favoured by deep innovation</p>
<i>Economical</i>	<p>-Large industry prevails, with strong push from military requirements. It is able to mass-produce anything but without the agility to respond to quick changes</p>	<p>-Industry is mainly small, agile and distributed. It cannot flood the market as an organised, large-scale industry can but can capture and respond to the rapid changes of the landscape</p>
<i>Military</i>	<p>-Called to operate in multiple contested domain with multipurpose assets</p>	<p>-Armed forces are present mainly for resolving small-scale sub-regional hot spots without the need for global intervention</p>
<i>Political</i>	<p>-Fragmented world, strong regionalism. -Strong control through extensive global intelligence. -Large regional powers in contrast</p>	<p>-Strong global cohesion. -The UN is the main governing body for resolving disputes and procuring funds. -Numerous lobbyist entities with contrasting interests</p>
<i>Legal</i>	<p>-Lack of standards</p>	<p>-Standards that are well supported</p>
<i>Environmental</i>	<p>-Resources are scarce</p>	<p>-Resources are abundant</p>
<i>Social</i>	<p>-Sharp inequalities in income and satisfaction, strongly dependent on the social group of belonging. There is no peaceful coexistence across mixed societies. -Media outlets are varied and heterogeneous.</p>	<p>-Income is satisfactory for everyone and there are no sharp inequalities ranging across social groups. Societies are cohesive and supportive. -Media outlets are homogeneous.</p>

Steps 4 – Relevance for Defence and Security (D&S)

■ Impact assessed using the following questions:

1. Do the changes in *Future STS* impact Defence and Security (D&S) capabilities? Does something impact everything or just specific capabilities/ area of a capability?
 - I. Assess the potential for impact (Y/N)
 - II. Assess the probability of impact coming true (high/Low)
 - III. Assess the “level of regret” (A, B, C, D)
2. What are the Drivers and Resistors of changes?
3. Are impacts from *Future STS* coupled in different scenarios?

■ Facilitates development of Insights & Options for Mitigation of Impact

Identifying Drivers, Resistors & Impacts for clients

Scenario	FW 4	FW 5
Drivers	<ul style="list-style-type: none"> • Fractured world • Need for better defence regionally 	<ul style="list-style-type: none"> • Standardization • Innovation • Interconnectivity • Global industry
Resistors	<ul style="list-style-type: none"> • Isolationism (only countries with resources are able to develop autonomous solutions for last mile) • Regime level bullets regarding standards, data-driven logistics • Integration possible on a global/multi-actor environment 	<ul style="list-style-type: none"> • Global stability discourages military innovation • Immature technologies
Impacts	<p>High impact</p> <p>Weak infrastructure</p> <p>Transient networks</p> <p>Each to their own</p>	<p>High impact</p> <p>New vulnerabilities in infrastructure</p> <p>Distributed networks</p> <p>Commercial + ethical issues</p>

Multiple ways to consider the impact characteristics

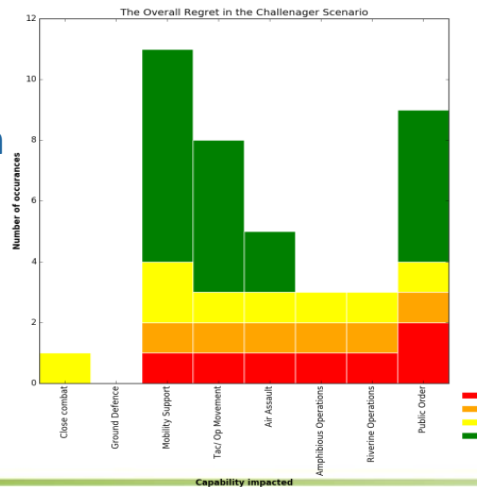
Disruption Calculus = Game changing
ability to respond

Regret = Using emotion to aid assessment

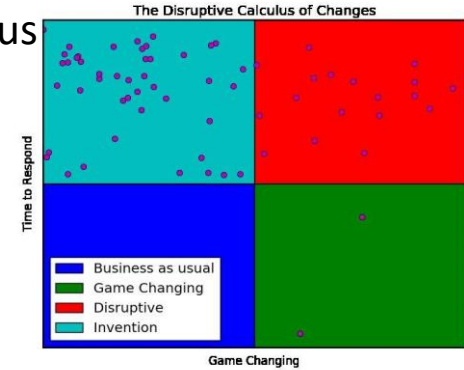
Time = earliest and latest it could occur

Regret

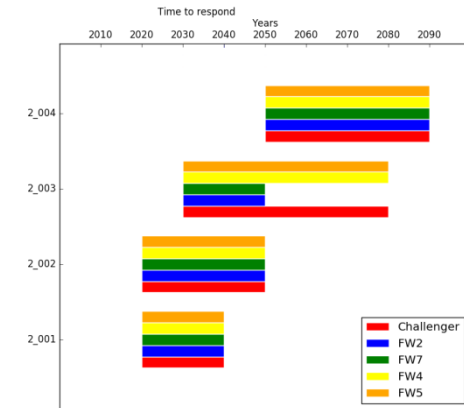
Provides a more *emotive*, and thus often a better assessment.



Disruption Calculus



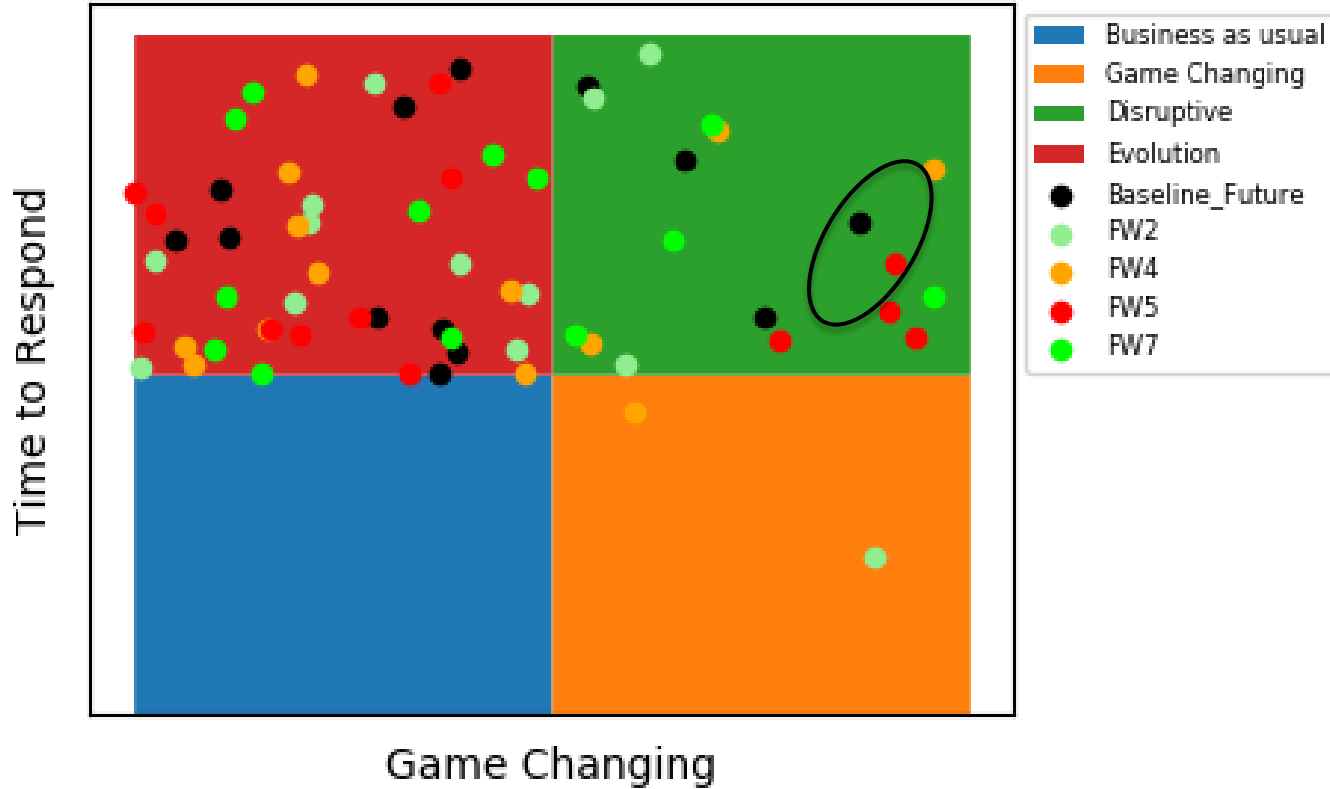
Time



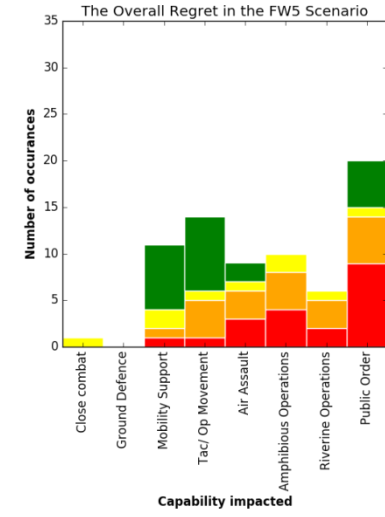
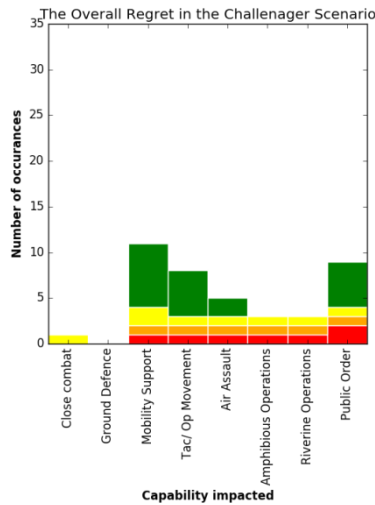
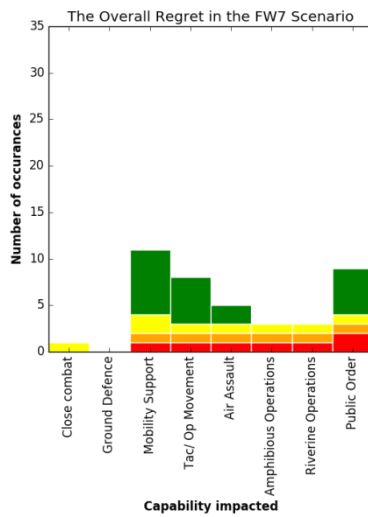
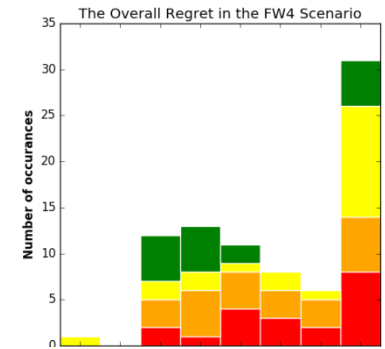
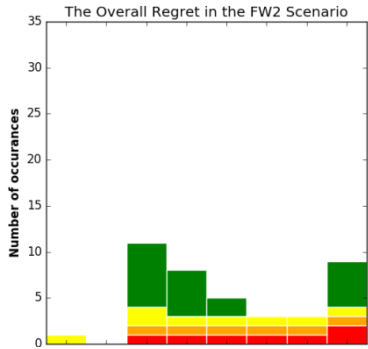
Impact visualized in terms of a Calculus of Change

The Disruptive Calculus of Changes

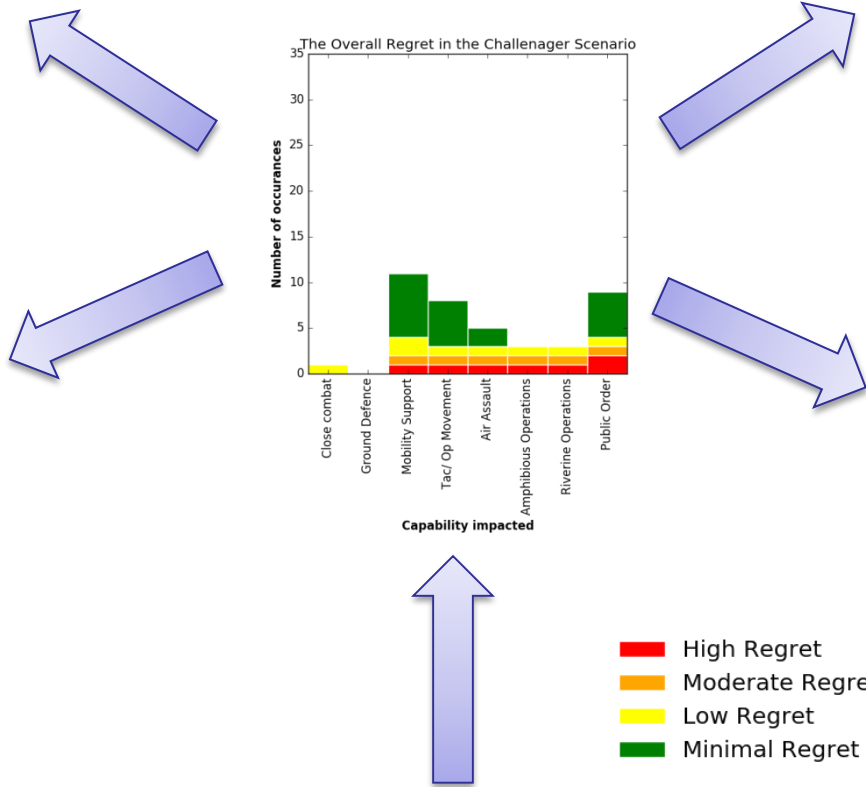
CanCannot.....Respond



Are impacts from STS coupled in different scenarios?



- High Regret
- Moderate Regret
- Low Regret
- Minimal Regret



Unintended Consequences of not using a FATE like method

1. Electronic Health Records

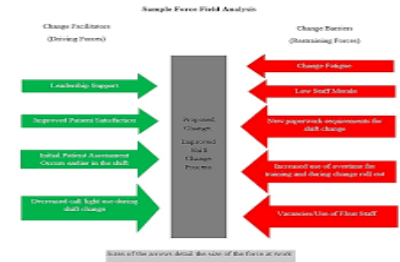
- Problematic data entry/retrieval
- End-user resistance
- Complexity
- Physical space for PCs etc.

2. Mobile phones and healthcare in India and China

- Correlation between mobile phone use and healthcare access
- During illness, individual phone usage increases (eg to access online diagnosis etc)
- Increases burden on, and access to, healthcare professionals and facilities

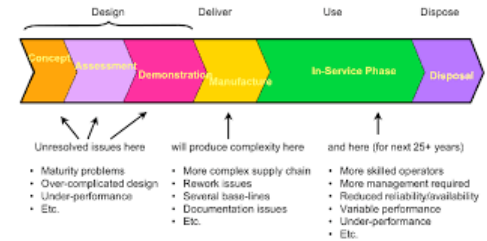
Examples of Tools Complementary to FATE

■ Lewin's Force Field Analysis



■ CADMID cycle

- Concept, Assessment, Demonstration, Manufacture, In-Service, Disposal/Termination



■ TEPIDOIL

- Training, Equipment, Personnel, Information, Doctrine, Organisation, Infrastructure, Logistics (DOTMPLF(I) in US (NATO))



FATE is unique because it takes

1. A multi-disciplinary examination of transitions of technologies (emerging or potentially disruptive) in the form of an STS
 2. An understanding of complex interactions that enable transitions
 3. An awareness of Drivers and Resisters
 4. Also provides opportunities for *FATE*-lite (modular form)
- All above in the context of Defence and Security
 - All facilitate our understanding of how **disruptions** may occur, how to plan for them, how not to have regret....

.....and thus *FATE* provides an anticipatory answer

FATE would be even better if....

- ... *it had a broader user base (i.e. not just defence),*
- ... *it was used in combination with other tools*

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