

# Drafting a Bottom Line: Currencies for the Inputs and Outputs of Discretionary Operations

Ian M. Mitchell

Principal Analyst, DERA  
Ministry of Defence, Main Building  
London, England, UK.

*Ian Mitchell has worked in Operational Research (OR) since 1988, following a flirtation with accountancy. For the Centre for Operational Research and Defence Analysis (CORDA) he initially produced historical data compilations. Studies of the land battle followed until 1992. After two years as an independent OR consultant to the UK Department of Social Security and European Space Agency he joined the Defence Research Agency (DRA) at Fort Halstead in 1994. He managed the Battle Group War Game, and led infantry studies. He moved to Porton Down in 1998 managing OR studies until 2000 when he became the OR specialist for the Directorate of Equipment Capability, Nuclear Biological and Chemical (DEC (NBC)). Ian served on the Council of the UK OR Society from 1994 to 2000. He was commissioned into the Territorial Army in 1984 and was introduced to OR as part of a Business Studies degree during 1986.*

## ABSTRACT

This paper considers an approach to the modelling of discretionary operations. Drawing on business modelling it uses the Input-Processing-Output paradigm to consider warfighting and Military Operations Other Than War. Whilst issues of risk are easily dealt with in the former the rewards for conducting the latter are often less clear. Outputs may be impact on group perceptions. Four perspectives are suggested to structure modelling and aggregation between these considered.

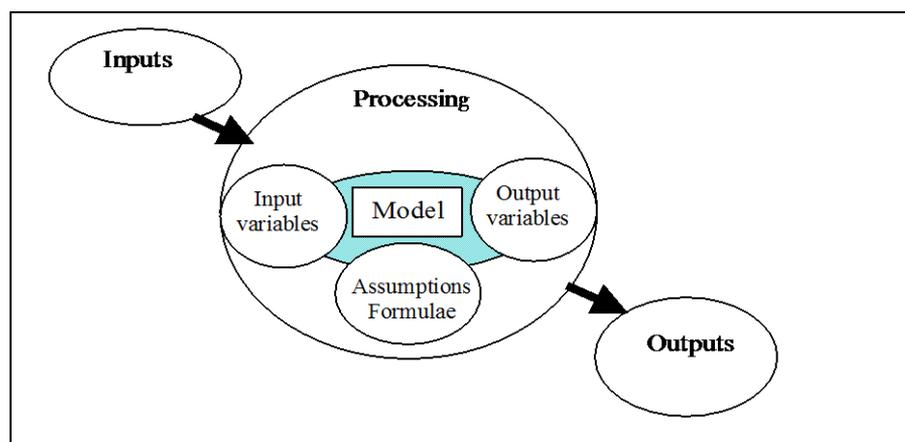
## INTRODUCTION

To launch discretionary operations implies the acceptance of sets of costs and risks to achieve rewards. Those directing such operations have considered a business case, perhaps tacitly, and decided that the venture is worthwhile. There is a need to consider this relationship and mechanisms to model its processes implicit in balance of capability and associated balance of investment studies. These have grown in importance in recent years and offer challenges for the practitioners of Military OR, otherwise known as Operational Analysis (OA).

The constrained resources for defence reflect the move from anticipation of a war of national survival envisioned as of the late 1940s until 1992. At the campaign level the last regime standing, with operative forces and some usable terrain, would have won. In the face

of the threat of destruction the risks of such high intensity operations become acceptable. The results were also relatively easy to identify.

Operations since 1990 have not concerned this type of total war. The prevention of evils, such as lawlessness or ethnic violence, implies a different sort of assessment. Whilst costs incurred remain tangible the benefits are less obvious. Some are in the form of perceptions generated well away from the area of operations as well as the direct outputs from the conduct of those operations. A generic modelling approach is illustrated below. This Input-Processing-Output approach is used throughout this paper (Figure 1). Business models are briefly overviewed, then warfighting and Military Operations Other Than War (MOOTW) are described.



*Figure 1:* The Input – Processing – Output approach.

Discussion of the benefits obtained for the risks run and costs incurred suggest currencies reflecting the interests of those involved to measure the inputs and outputs of operations. The location of boundaries in terms of scope and time for these models of perspectives of different groups of stakeholders is essential.

## BUSINESS MODELS

Commerce is blessed by the existence of a single metric for many of its works. This metric is money. Money is a means of symbolising the value of other goods and services despite its own intrinsically valueless nature (Figure 2). The bottom line, from an income and expense account, showing the value added or lost by a process undertaken by a commercial entity, is a well-established concept. The effectiveness of the commercial entity can be assessed by this output. Other factors are often applied but the profitability of an enterprise even if it is a charity (non-profit) body is essential to its continued functioning.

Within the representation of the model processing two fundamental formulae can be seen:

- Money (revenue or cost) = Price of units used x Number of units used.
- Revenue – Cost = Profit.

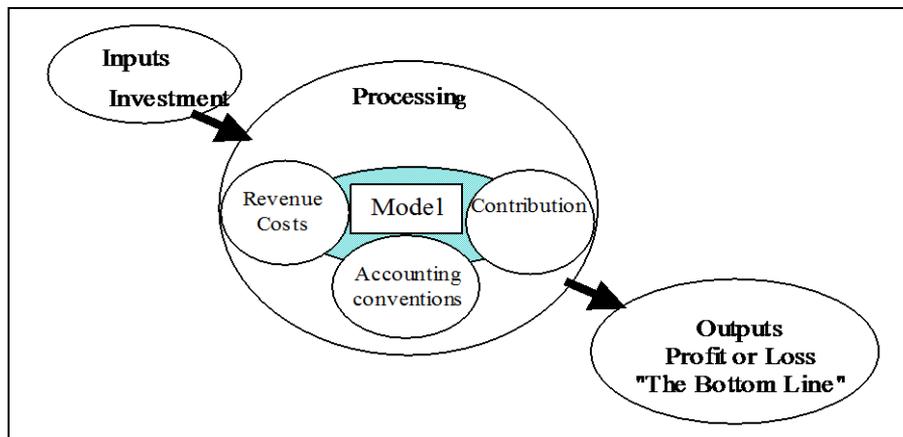


Figure 2: Generic Business Model.

There are many debates on what should be recognised as a cost or revenue, particularly by other interested parties such as tax gatherers. Other metrics exist often as ratios for price earnings or returns or investment. They draw on the core processes of business as defined by these two formulae.

Defining the boundaries of a business, where one identifies inputs and outputs, is critical. This includes what is deemed to be a part of a business and the timescales used in measuring this property. An example of this may be seen in the example of accounting for some underwriting syndicates at Lloyds of London.

The basic insurance model depends on income from premiums for policies remaining greater than the claims settled. Some syndicates were at one time privileged in their ability to hold American dollars whilst reporting the results of the underwriting in pounds. As a result, the changes in the Pound to Dollar exchange rate could sometimes mask indifferent insurance results from the underwriting because of changes in the rate. In effect the boundaries of the business were moved by this change.

Accounting structures, whether cash flow or accrual based, can be seen to be types of model. They allow a view of the value of an operation to be formed based on a set of stated assumptions. Accountancy is retrospective. When OA models are run retrospectively it is usually for the purpose of verification and validation. The OA models' purpose in use is to assist in the selection of better ways of conducting an operation in the future. Two groups of operations commonly discussed are warfighting and MOOTW. Both can exist as discretionary operations.

### WARFIGHTING: INPUTS AND OUTPUTS

The process of warfighting may not be efficient but is sometimes effective as the Duke of Wellington observed with regard to Waterloo: (Contained in Despatch 1815 and cited in Wellington's Tomb, see: <http://www.stpauls.co.uk/about/thecrypt/wellington.htm>)

“Nothing except a battle lost can be held so melancholy as a battle won”

In the attritional high intensity battle the rewards attained or outputs can be measured in terms of immediate casualty based metrics, such as the Loss Exchange ratio, and ground won, retained or lost.

Within studies representation of the processes of forces seeking advantage from the circumstances of terrain and environment by moving, finding and engaging one another are at a number of resolutions from formations to the individual soldier. Timescales similarly vary from hourly rates of attrition between abstract entities representing groups of platforms and participants down to second by second resolution of events, such as the trajectory of each individual bullet or burst fired.

The time represented in studies tends to be short, within the bounds of the overall campaign and often only a couple of hours or less at higher resolution. Casualties are therefore seen to occur when performance within the battle is affected.

Sun Tzu observed that weapons are tools of ill omen and that supreme excellence lies in breaking the enemy's resistance without fighting. There are options other than warfighting. Over the last decade these MOOTW have become increasingly common, so Sun Tzu's comments appear more relevant.

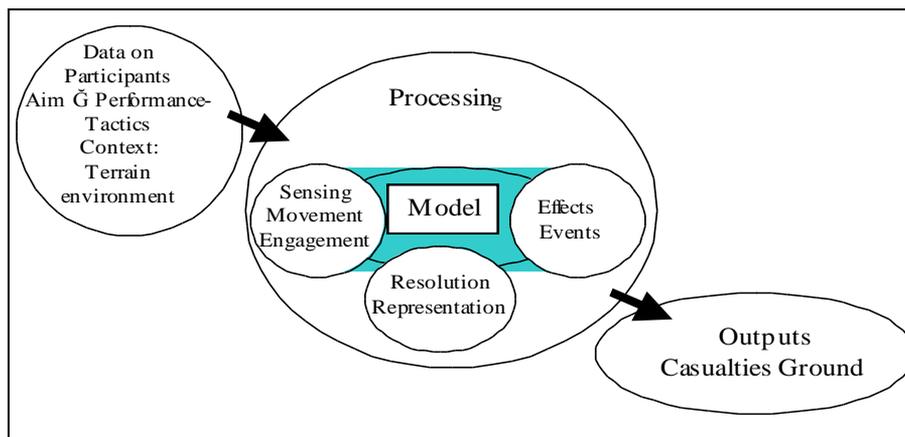


Figure 3: Generic warfighting model.

### MOOTW: INPUTS AND OUTPUTS

Although Peace Support Operations may have small pockets of highly intense warfighting; they have a different nature from operations centred on warfighting (Figure 4). There is often no immediate threat to the realm whose directors decide to participate. Their conduct may be over years before it is feasible to determine if they have succeeded or not.

If the decision to become involved is taken this implies that a directing entity has evaluated a set of risks against perceived gains and decided that the venture is worthwhile, recognising that there is an element of uncertainty in the outcome.

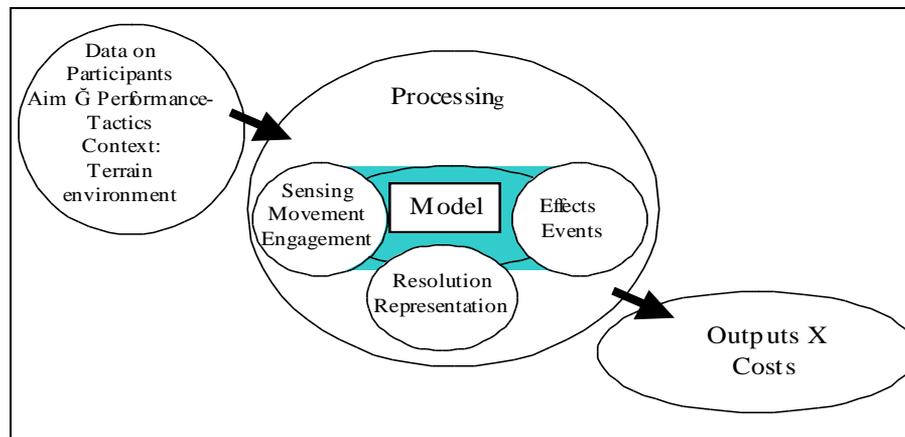


Figure 4: Generic MOOTW model.

In MOOTW there are likely to be many identifiable groups of participants, some armed others not and many with different agenda. Engagement may include humanitarian actions rather than the managed violence of warfighting. Outputs from MOOTW have two forms: the costs incurred and the benefits obtained.

Costs of operating in MOOTW can be seen to have additional forms to the casualties in warfighting: The value of the time of people deployed as a yardstick for effort, with money, consumables expended, and wear and tear to assets.

With respect to casualties public debates on Depleted Uranium (DU) munitions in early 2001 illustrate the different perception of what constitutes an acceptable risk. The definition of a casualty is no longer based on symptoms so acute that an individual is immediately incapacitated. The arguments over the existence of a Gulf War syndrome imply that casualties should be considered in terms of subsequent invalidity over decades as well as acute injury during the operation.

The positive outputs sought of the operations are less tangible hence the X in the figure. They may be the absence of evils in the short term, such as reducing incidents of ethnic violence. Measuring this absence of casualties may seem akin to recording the sound of silence. Negative metrics exist e.g. low or absent rates of serious crimes against the person measured against a normative baseline.

To survey the progress of economic sub-systems offer measures of proxies demonstrating that market distribution systems are working. The timescales of these activities are longer than those of warfighting, and their scope is broader making the measuring of progress more difficult.

In 2000 the MoD used the tagline “a force for good.” The action in Kosovo exemplifies willingness to intervene in another state. This is a major change from the situation established by the 1648 Treaty of Westphalia. Clear identification of what “good” may be is essential.

A broader issue on the valuing of the outputs of a discretionary operation is the establishment of a new political economic system to replace a collapsed society or an unacceptable system, even if the latter is sustainable in itself.

The taking of a detached view at a level above the societies involved may be necessary to demonstrate that a discretionary operation is worthwhile. An index for the global state may be needed.

The operation may generate security as a foundation for subsequent development of an economy up a hierarchy of needs analogous to that proposed by Maslow for individuals, as shown in Figure 5.

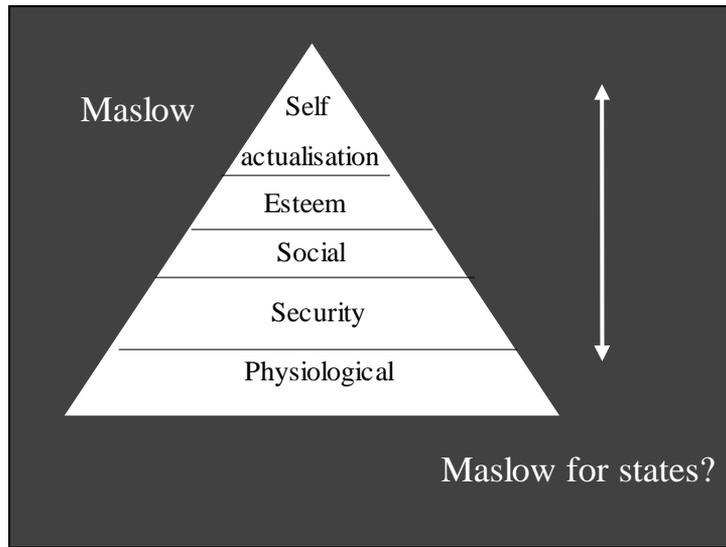


Figure 5: Maslow’s hierarchy of needs for individuals.

Thomas Hobbes’ book *Leviathan* had a striking image of a kingly figure composed of many individual peoples. As states are composed of individuals so an analogous hierarchy may be drawn for them. This is illustrated in Figure 6, below.

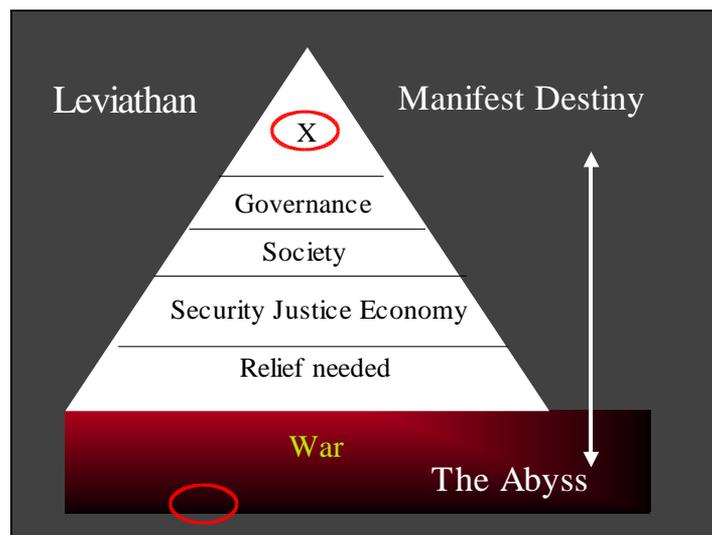


Figure 6: Hierarchy of needs for a state.

The terms of the levels have been adapted from Maslow’s scale. From relief, perhaps from natural calamity rather than political discord, security, justice and economic systems are essential. Governance covers the working of administrative government, including the nature

of leadership and participation. Society describes the interactions of citizens including artistic endeavours.

The equivalent of self-actualisation is shown as an X. This will reflect the achievement of the values of the society, hence the phrase “manifest destiny.” Some societies may have destructive values (Figure 7). The phrase “Carthago est delenda” (Carthage must be destroyed) was used repeatedly within the governing circles of Rome might be seen as an example of an aspiration becoming part of the state’s self-actualisation.

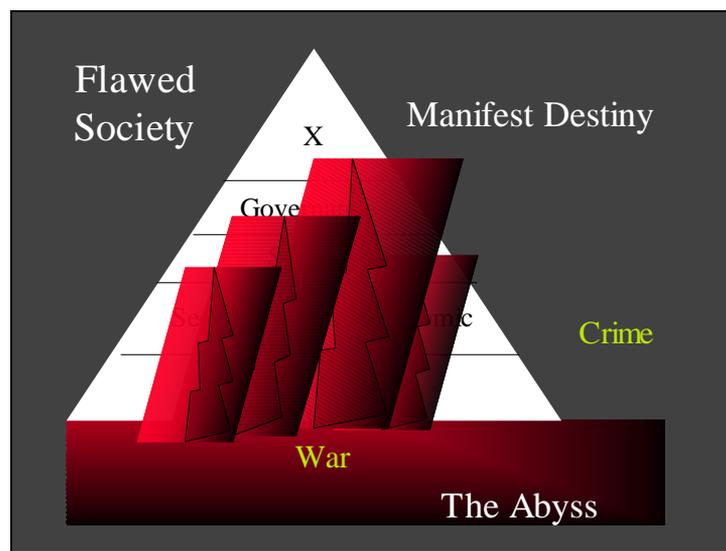


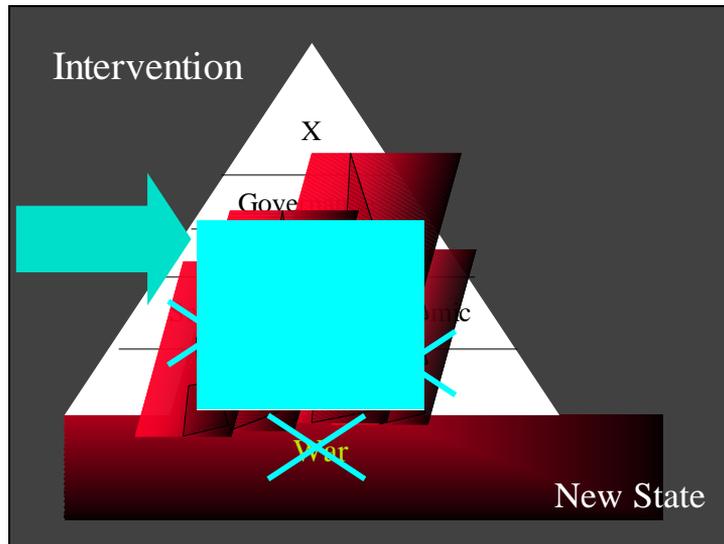
Figure 7: Flawed society.

In the illustration the scale is increased below that of Maslow’s showing the consequences of a failing state (Figure 7). This “abyss” is intended to cover the situations arising in wars and genocides. The circled area indicates an extreme, such as the machete-wielding youth asking “short sleeves or long” of a victim. This enquiry means would the victim prefer to have arms mutilated at the wrist or elbow, as described by Shawcross’s account of Sierra Leone. Such conduct is unacceptable to Western democratic consciences and intervention is used to put an end to it. In this we may see an equivalent to self-actualisation by the intervening states (Figure 8).

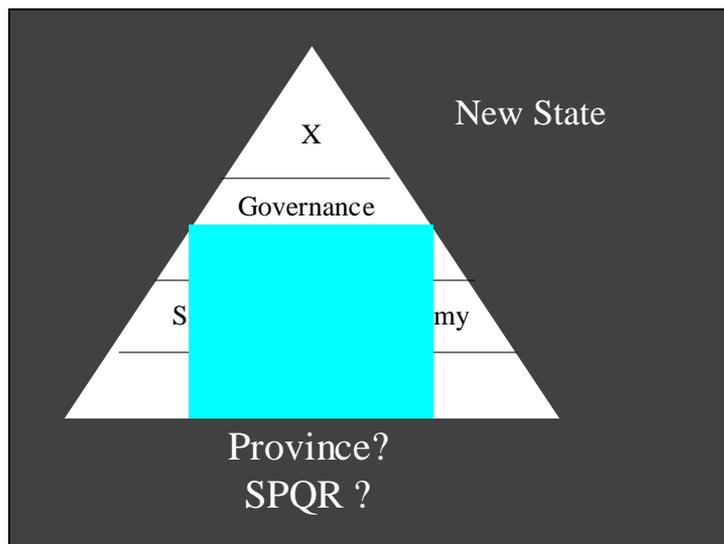
The client society may not be at a single level throughout. There may be areas where governance and society may be carried out, whilst relief is needed in others. Crime may be seen as a fissure in the fabric of the affected society. Beyond a certain point of concentration crime will prevent the state functioning effectively.

Having removed the worst evils the question of what next arises. Some forms of government can be transplanted successfully but not universally: “Westminster (or Washington) in the wilderness” may not be able to flourish in all circumstances.

The shaded area in Figure 8 indicates the levels, which PSOs have supported. Immediate needs are met but how far up the levels an intervention seeks to move the client state is varied. There is a strong focus from the current Western interveners on the exit criteria. This can screen the question of what the nature of the client state should be as a result of the intervention.



*Figure 8:* Intervention removes perceived evils



*Figure 9:* New state.

If enough of the intervener's values and systems are imposed the client effectively becomes a province of the intervener. The Roman Empire is an example where such expansion was accepted. Such empire building does not seem likely to be acceptable now (Figure 9).

### PROPAGANDA — DESIRABLE OUTPUTS

In the literal sense propaganda means things which ought to be put forward [to support a case]. To identify the rewards obtained by those involved with conducting operations, the X product of the model, study of what an organisation promulgates about itself offers a means to gauge what outputs it values sufficiently to put them forward.

The cover of the February 2001 issue of *Soldier*, the magazine of the British Army, has the headline “SIERRA LEONE: WE’RE TIPPING THE BALANCE.” The cover shows Media operations officer Major Debbie Noble holding a youngster at the camp for amputees and war-wounded in Freetown, Sierra Leone. Inset is a picture of Kate Adie, the BBC news reporter, advertising a retrospective set of articles on The Gulf War – Ten years on. These stories indicate two outputs valued by one group of participants:

- Providing aid to the children of a failed state.
- A successful warfight.

The index suggests other issues deemed worthy and desirable of reportage for the participants. There is a mixture of non-operational themes from long term health (DU) to challenges successfully overcome (expeditions, disability, cost-cutting in training, sport) and administration (housing) and due regard for the civilian community (noise control). Although *Soldier* is a magazine for the Army it recognises the existence of other groups.

#### **FOUR PERSPECTIVES**

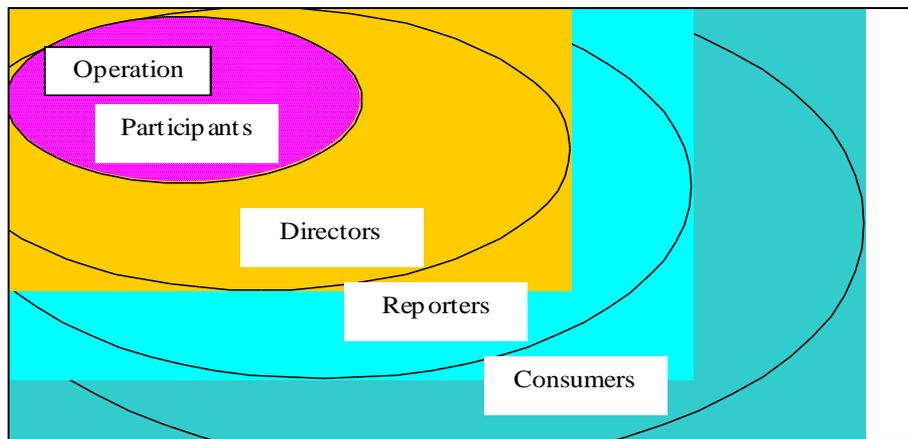
The use of “Balanced Scorecards” recognises that there are material differences in outlook of stakeholders and seeks to recognise measures for these different perspectives. To represent the benefits of discretionary operations the different groups of stakeholders need to be identified.

Four groups involved with discretionary operations can be identified in the discussion of MOOTW. The four groups are:

- The participants in the operation, acting as agents for the directors.
- The directors of the participants.
- Those who communicate the conduct of the operation to consumers.
- The consumers, members of the society directed.

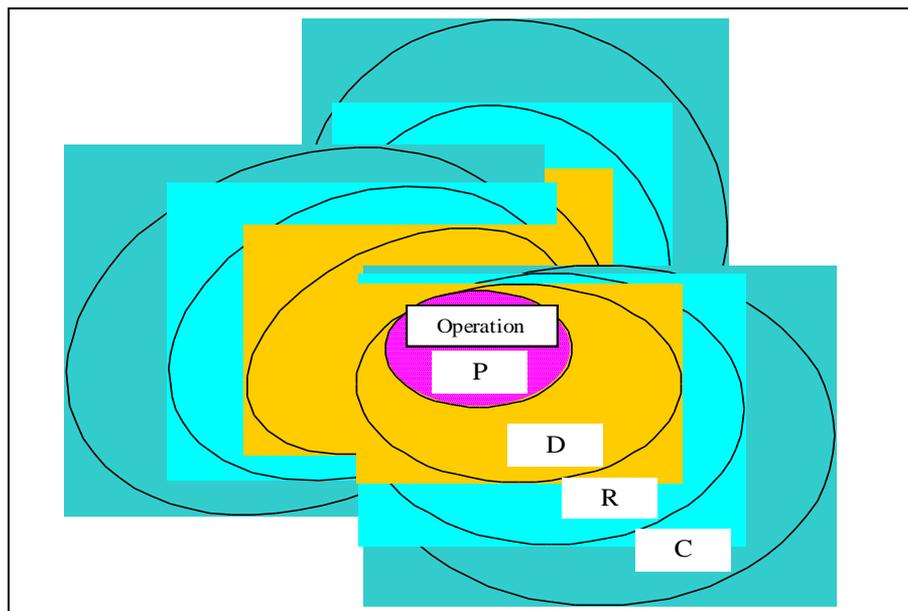
Figure 10 illustrates the four groups involved with an operation. John Warden’s *Inside out warfare* uses a similar model of rings, as cited by J.P. MacIntosh in an earlier Cornwallis conference (Canadian Peacekeeping Press, 1996). The four groups are by no means homogenous. Factions exist in all of them and they have a complex set of interrelationships.

Both participants and directors can expect reporters to take an interest in their activities. The reports generated are passed on to consumers. The directors draw their mandate for power from the consumers.



*Figure 10:* Four ring model of groups.

The OR challenge is to consider each of these groups' sub-models and if a means to aggregate them exists. Considering the operation overall there will be as many sets of these four groups as there are parties as illustrated below (Figure 11). Under each group of directors, D, the participants, P, interact in the operation, with reporters, R; describing their actions back to their own consumers, C.



*Figure 11:* Three-party operation.

Membership of the groups is transitory and driven by circumstance. For even the most disastrous discretionary expedition, only those reports made and surviving the attentions of the directors reach the consumers.

In contrast when the consumers are directly involved the operation is no longer discretionary. A terrorist bomb, enemy combined arms force invading or a nuclear strike are all outside the power of the directors. They make involuntary participants of those who would otherwise be consumers. Their participation may be limited to being legitimate targets.

Discretionary operations include warfighting and MOOTW. The spectrum of conflict towards General war brings these rings closer together and causes overlaps. The rings are kept apart if operations are truly discretionary and expeditionary. The overlaps between them increase as the scale of violence is ascended towards total war, where opposing consumers are viewed as legitimate targets. The bottom lines for the four groups differ in the currencies which they use.

## MODELLING THE RINGS

The participants are concerned with the conduct of the operation (Figure 12). The outputs for the participants' activities are their survival and achievements both as organised units but also as individuals. Much OA is directed towards the improvement of the first two of these outputs in western countries participating in discretionary operations particularly for those centred on warfighting. The capability is designed with support from OA for the decisions made on procurement.

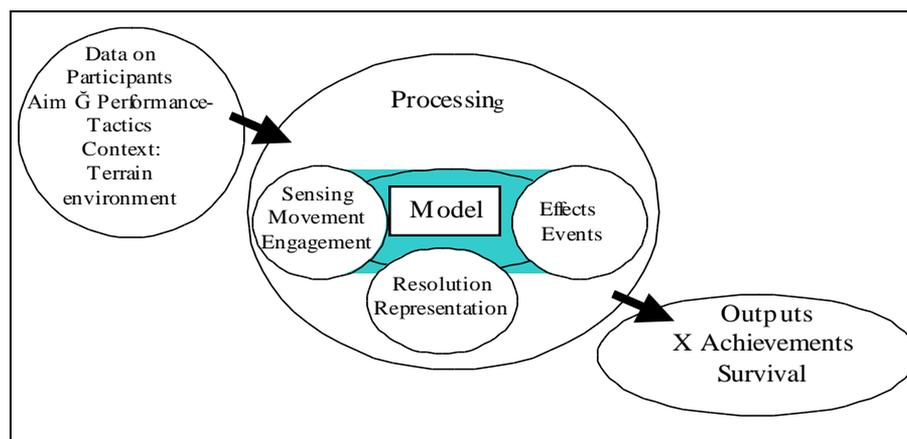


Figure 12: Participants.

OA also helps to get the best use from the capability, which has been fielded in the circumstances prevailing. Decisions made without such analysis increase the risk of failure of the operation, if forces incapable of the objectives are committed.

Unwise decisions are to be found throughout history, at all operational levels. The Nazi invasion of Russia throughout 1941 to 1943 offers many examples of misused capability of which the operations at Stalingrad are particularly striking.

The directors are the immediate customers of the operation (Figure 13). In setting it in motion they expect to further their own agenda. Victory is no guarantee of electoral success and unsuccessful operations or operations inefficiently managed have led to changes of director in democratic states at the next electoral opportunity.

What the electorate makes of an operation depends on what is communicated to them. For the tyrant, a calamitous operation may have limited effect, provided the operation is kept apart from the consumers and the reports about it controlled as needed.

In democracies the directors need reportage to develop support for policy decisions including their continued tenure of office. Even the worst tyrants have had excellent media skills supporting repressive internal policing. Until the operation outcomes intrude on their societies the latter may continue to function.

As all military operations have the potential for conflict they have a natural potential for drama. The reporters need to generate merchantable reportage with which to attract an audience (Figure 14). The business models of media depend on the size of the audience whether through direct sales or as the basis for charging advertising rates if a medium is to survive.

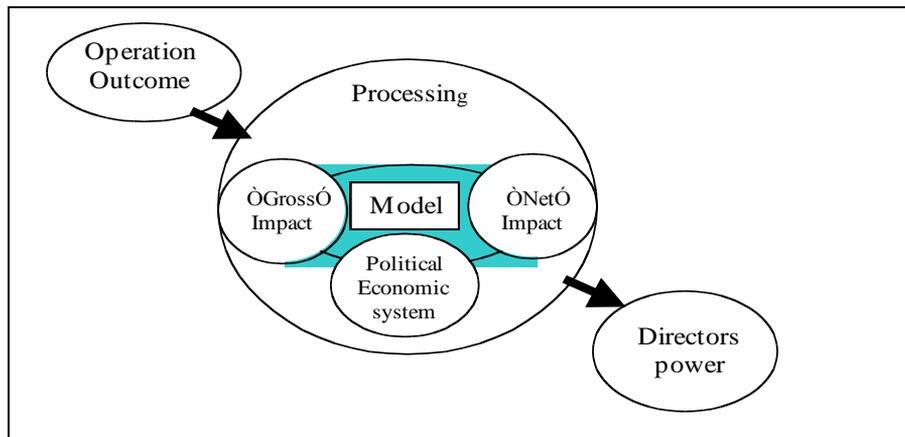


Figure 13: The Directors.

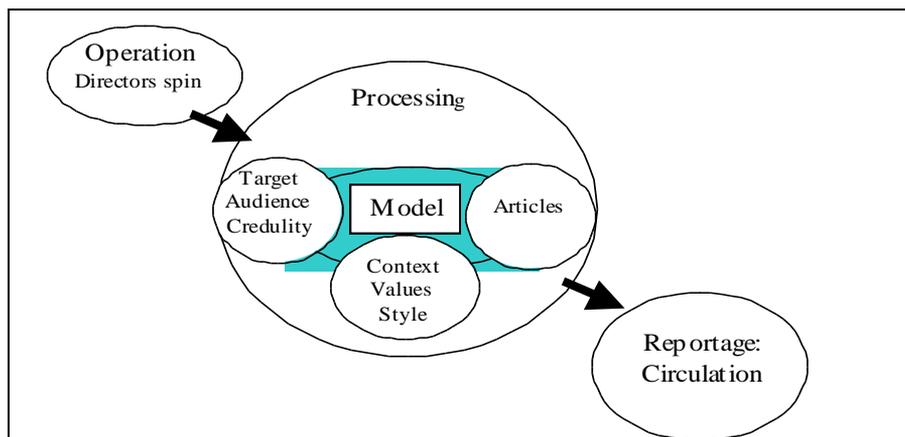


Figure 14: The Reporters.

All types of media generate stories, abstracting reality and presenting it in a form attractive to an audience. For printed media there may be different audiences segmented by preference for word length and number in the stories provided. Topics of immediate relevance to the audience are a *sine qua non*, but there is more to reportage.

The headline stories from *The Times* of 14 March 2001 and 15 March show aspects of the major subject in the UK — the Foot and Mouth Disease (FMD) emergency.

- Even the music of Dido could not hide the sound of slaughter.

- Prince gives £500,000 to help farmers.
- Up to his ankles in mud and death Simon de Bruxelles meets the slaughterman.

Two to three pages of *The Times* were dedicated to FMD stories per day during February and March 2001 although there was a palpable reduction in coverage after the first wave of outbreaks in the UK. The titles above are indicative on the news as being a source of entertainment as much as a source of information.

If the story looks likely to interest an audience it may be published. There is no mandated set of aspects to cover in the manner of a military situation report. Scandal, novelty, extreme behaviour, and anything remotely connected with sex play as well as horror and probably better than acts of generosity. More stories from 15 March 2001 included:

- Stock market traders ride a roller-coaster.
- Hospital chiefs quit over secret waiting list.
- Complaint by patient uncovered list scandal.
- Nude academic beats council ban on strippers.
- Wife is forgiven for “poisoned Weetabix.”

Reporters have different interests from participants or directors. Joe Joseph provided another view of the directors as a source of stories.

“Politics is just another open-ended pointless soap opera, complete with artificial crises and confected conflicts, all of which are meaningless within a week.” (Joe Joseph Times 2 p 23 12 Dec 00).

The dichotomy may be best illustrated by the 1982 UK tabloid newspaper, which declared itself: “The paper that supports our boys.” It was subsequently criticised by others with the allegation: “... and makes up interviews with their widows” over the authenticity of an article.

The stories can be seen as abstractions of current events interpreted according to particular sets of values. The latter may fit with those of some of the directors — in the UK *The Daily Telegraph* is the “Torygraph” to some press observers.

A disastrous operation does not necessarily lead to reportage unfavourable to directors or participants. Sub-phases may be emphasised, down to the heroic performance by individuals in unfavourable circumstances. Where the operation takes place towards the high end of the spectrum of conflict and impinges on the society the reporter may become more of a participant in the decision of what images should be shown.

Examples of these aspects may be found in the various accounts of the 1991 British patrol Bravo Two Zero. The responsibility to the UK war effort taken on by the Press is

apparent in their coverage of the evacuation of Dunkirk particularly via the choice of images published in 1940.

The consumers are the source of a director’s power, the audience for reportage and the source for participants (Figure 15). The director remains in power by their action, principally voting at the next election and paying taxes, or inaction, by not rebelling. The consumers are also the long-term source for the participants and the resources committed to operations.

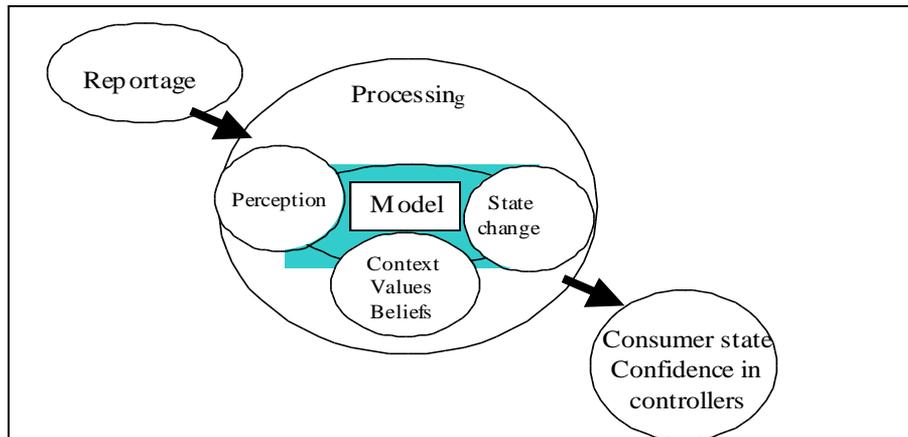


Figure 15: The Consumers.

The consumers’ opinion is the driver for the “Something must be done” pressure which has triggered a number of recent discretionary operations. The reporters are instrumental in generating this pressure by their choice of what stories to research and run. There seems to be the potential for a positive feedback loop to develop between the reporters finding a story which sells well and consumer pressure for action to be taken in the situation described in the stories. Figure 16 maps the whole system, or society, composed of these four sub-systems.

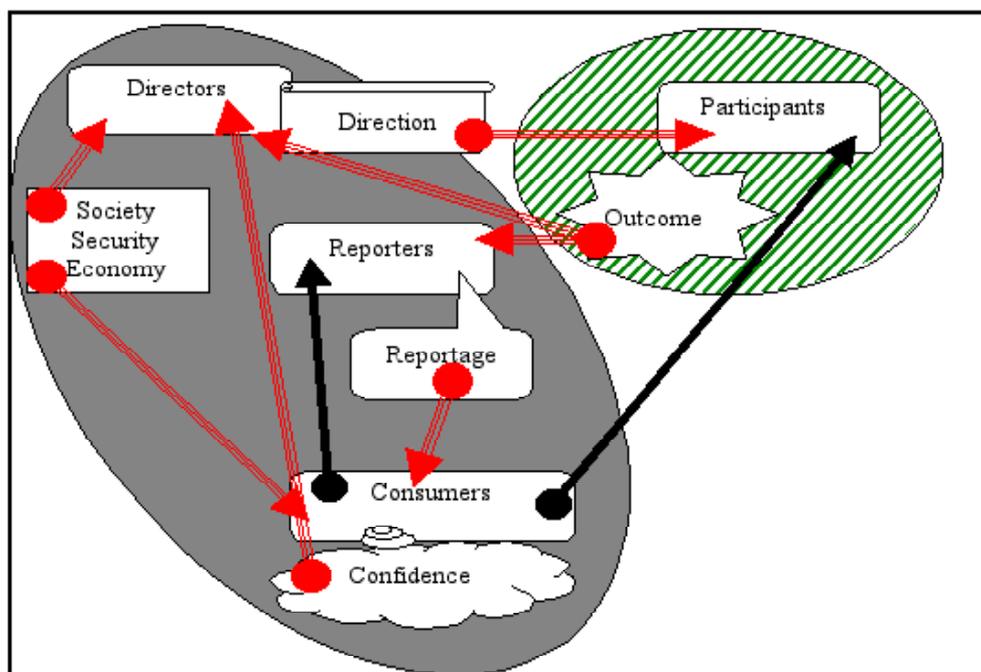


Figure 16: The four groups in context.

As long as the operation remains insulated from the society whose participants are involved then the interests of the groups remains apart. Where operations affect the Society they lose their discretionary status as the set of participants expands to include consumers and reporters.

Discretionary operations are only one part of a society's activities. Consumer confidence is driven by what happens at home within the society as well as operations undertaken.

### THE VALUE OF X

The currencies suggested in the discussion of the four groups are separate. Table 1 uses a worst case to best case range for each of the four groups with the bottom line being for their society as a whole.

A successful operation favours the achievement of the top end of the scales for all the others. This is not the case for unsuccessful operations, when the divergent interests of the groups become apparent. The bottom row of the table represents the society as a whole. Discretionary operations alone are unlikely to lead to obliteration or damage to the Society, although they may be steps towards catastrophe at a future date.

Scale	-100%		0		+100%
	Disaster		Neutral		Success
<b>Participants outcome</b>	Loss of force, Defeat	Damage to force Partial failure	Inaction	High Costs Purpose achieved	Survival of force Challenge met
<b>Directors Power</b>	End of office	Standing diminished	Power unaffected	Power expanded	Power enhanced Objective achieved
<b>Reporters Reportage</b>	No stories	Limited coverage	Some stories	Useful copy	Scoop coverage
<b>Consumers Confidence</b>	Collapse of confidence Casualties	Depressed	Indifferent	Secure	"Feel good" factor
<b>Society</b>	Obliterated	Damaged	Surviving	Enhanced	X

Table 1: Range of results.

The X factor for the optimum output of a discretionary operation for a Society is difficult to define as it is based on what the society values.

This may be where changes to a state of the world index belong. Just as stock exchanges compress extended and fragmented processes of many participants to one index so something similar could be used. This would require a means of classifying the quality of life within societies.

$$\text{Aggregate of Quantity of societies at time 1} * \text{Quality attained at time 1}$$


---


$$\text{Aggregate of Quantity of societies at time 0} * \text{Quality attained at time 0}$$

Where a discretionary operation could be demonstrated as improving the aggregate then it would offer justification for being undertaken.

## CONCLUSIONS

Discretionary operations are often launched in response to the cry “Something must be done.” These operations are not based on an immediate threat to a realm so their benefits are less obvious. Determining if there is something that can and should be done is not easy in the absence of widely accepted models.

What is valued has to be reflected in the bottom line drawn. Four groups involved in discretionary operations have been identified. The operational outcome is not necessarily directly coupled with the fortunes of those who directed it those, who report on it or the consumers underpinning all three other groups.

The centre of the ring model proposed to organise them is the operation itself. Where the operation is based on warfighting or the threat of warfighting this suggests that military capability to be kept to an appropriate level to achieve the desired outcome with its associated OA remaining essential. Models of political economic systems seem essential for other types of operation.

The OA implied here has broader boundaries of processes and longer timescales than many approaches to warfighting. A global context may be required to determine if there is a worthwhile result to be had from the prevailing circumstances. The groups may enjoy separate success. Currencies to evaluate these have been suggested. To the challenge that “Something must be done” the chance to gauge what might be gained and lost is needed. This type of analysis requires a broader outlook than that needed for warfighting.

Research here might be seen as seeking to develop wisdom as sought in the prayer for courage to seek to change what can and should be changed, patience to endure what can not be changed and the wisdom to distinguish the two.

## REFERENCES

The Canadian Peacekeeping Press, 1996. *Analytic Approaches to the Study of Future Conflict*. p176.

Shawcross, W., 2001. *Deliver us from evil* p 25. Bloomsbury