

1. USING CULTURAL INFORMATION TO MODEL DIME/PMESII EFFECTS

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Abstract: Creating models that are based on cultural information is difficult, but not impossible. This paper describes a combination of the top-down approach typical of many Operations Research models with the bottom-up approach typical of anthropology. The anthropologist starts with the people and looks for those areas that form culturally important categories for the people being studied, such as cosmology, leadership, land use, social control, and affiliation. Deep ethnographies are used to create an anthropological model. A top-down model of the DIME/PMESII (diplomatic, information, military, economic/political, military, economic, social, information, infrastructure) system is then connected to the relevant anthropological models for an area.

Users would like simple models – ones that only require feeding in the current situation and alternative interventions or external events such as earthquakes, pushing the “go” button, and waiting for the model to present the predicted results. Operations Research (OR) professionals know that we don’t know enough about reality to allow for such simplicity – and that it isn’t certain that we ever will. OR professionals also don’t generally like the idea of push-button models, believing that the brain ought to be engaged before putting the model “in gear.” Anthropologists don’t normally look at the world in terms of predictions – and worry about the uses to which such models might be put. Using anthropological research for social “experiments” is strictly forbidden under their code of ethics.

However, there are valid uses for cultural models. One example is to prevent or reduce cultural damage done during humanitarian assistance and disaster relief operations. Natsios [1] describes how giving away food in Somalia caused problems with warlords using the food as a means of power and the destruction of shopkeeper’s business by zero-cost competition. A second example is found in stability and reconstruction operations. One goal of such operations is restoring “normality” to the general populace. Without an understanding of the particular cultural definitions of normality, mistakes are certain.

This paper explores a methodology for linking the anthropologist’s knowledge to OR techniques with the goal of creating useful models of DIME/PMESII effects. In this paper, DIME/PMESII will be used as shorthand for “all that counts.” DIME, which stands for Diplomatic, Information, Military, and Economic, represents the range of interventions that can be brought to bear on a situation. PMESII, which stands for Political, Military, Economic, Social, Information, and Infrastructure, represents the range of descriptors of the situation, before, during and after an intervention.

1.1 CONTRASTING APPROACHES

The following descriptions are meant to be exemplars, rather than definitive descriptions, of the ways in which OR and Anthropology work.

1.1.1 An OR Approach

Figure 1 illustrates a top-down approach to creating a DIME/PMESII model. The starting situation in a region of interest is represented by its PMESII values, as shown at the left. The desired situation, as represented by its PMESII values, is shown on the right. Proposed or alternative DIME interventions are shown at the top of the figure. The model is represented by the box labeled “Interactions” in the middle. In order to figure out the proper DIME interventions, information about the starting situation is required, as well as inferences about the interactions between the starting situation and the interventions that might lead to the desired situation.

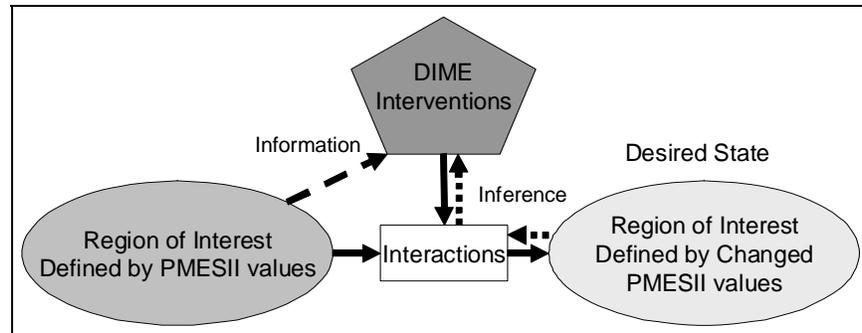


Figure 1. Construction of a DIME/PMESII Model: Typical OR Version

In the top-down process, the model is constructed by defining the ways in which each type of intervention affects each of the host of PMESII variables, along with all interactions among the variables as they change.

1.1.2 An Anthropological Approach

The anthropological approach is bottom-up. That is, the anthropologist starts with the people and looks for those areas that form culturally important categories for the people being studied. Examples of potential categories and some of the questions that must be answered in defining the nature of the categories are shown below.

- Leadership
 - What factors determine who becomes a leader?
 - What factors are involved in social schisms?
- Land use
 - What factors determine where a person/group settles?
 - When people move outside traditional territories, what parts of their lives remain unchanged?
- What is the nature of the universe, as understood by the people?
 - Where do people fit into the cosmology?
 - What “beings” or forces affect reality, according to the cosmology?
 - What is the nature of the relationship between people and the natural universe?
 - How is individual and social health defined?
 - What causes physical or social illness?
 - How separate are the “natural” and supernatural” realms, according to the cosmology?
 - What is the source of human power, according to the cosmology?

- Issues of social control
 - How do people deal with disagreements?
 - How does the group deal with those who break social norms (or laws)?
 - Who gets to decide punishment?
 - How and when is praise bestowed?
- Affiliation
 - How do the people define who is in the "in-group"?
 - Under what circumstances do people change affiliation?
 - What types of affiliation are strong? (E.g., familial, religious, linguistic, economic, friendship, marital)
 - What is the relative strength of the various types of affiliation a person practices during his/her lifetime?
- And so forth

An understanding of this base-line information as it relates to a social or cultural group is necessary if one is to understand what happens when things go wrong. For instance, what disruptions in the above dimensions are likely to result in violence? What internal mechanisms are in place to help the system return to a non-violent state? If none exist, then what would the effects be of externally imposed mechanisms? Understanding the various factors, in what circumstances they are strengthened or weakened, and how they interact requires a multi-dimensional view.

1.2 COMBINING THE APPROACHES

Figure 2 illustrates the basic concept of combining the two approaches and shows where the problems lie. The first step is to model reality by deriving the areas of importance (a taxonomy of values) for the given culture. The second step is to use the ethnographic literature and field experience to decide how to connect these values to a DIME/PMESII construct in different situations. Thus, the outcomes are filtered through two models.

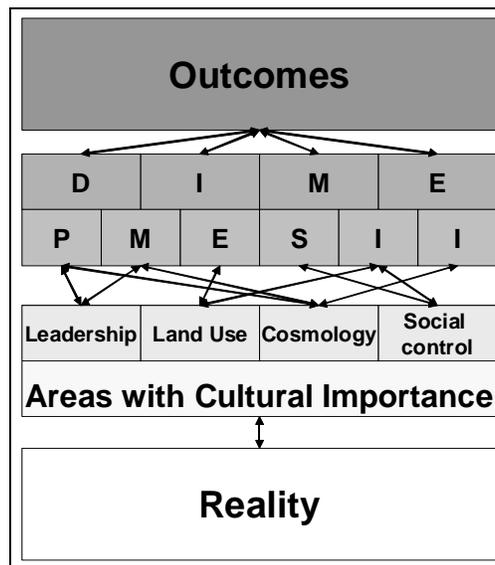


Figure 2. Layered Approach

At this point, step two requires amplification.

1.2.1 Sample Step 1

We start by putting some flesh on the bones of Step 1 to make the illustration more concrete. Consider Southwestern Alaska as described by Partnow [2].

- The Setting: Alaska Peninsula, home of the Sugpiaq people
- Background: Contact with Westerners began in the late 18th Century when Russian traders and explorers arrived.
- Conversion to Christianity occurred in the early 19th century
- Intermarriage with Russians and other Europeans became common, if not universal
- Livelihoods continued to be centered on natural resources despite forced work for Russian traders and sub-par employment in the fishing industry
- Use of Western goods and a mixed cash-hunting/gathering economy have persisted to the present
- Land was conveyed and fishing rights confirmed in the late 20th Century.
- Television, computers, and frequent air travel from the 1980s to the present have pierced the geographic isolation of the region.
- For purposes of this example, assume that the areas of cultural importance have already been determined through fieldwork and ethnographic research.

The following list sketches the historical Leadership, Identity, Land, Cosmology, Social Control, and Affiliation categories for the culture.

- There was no single leader of a community; leadership resided in the heads of families (though Russians tried to designate village chiefs).
- Identity was tied to the family first, then village or region -- although people were very mobile.
- Land use was opportunistic; land was not understood to be owned, but the family that had customarily used a piece of land had priority over its future use.
- Cosmology: The world is populated by sentient beings, including humans, animals, plants, land forms, and other non-human beings. In order for humans to survive in a world where they are the weakest (and not necessarily the most intelligent), agreements have been made with animals who allow themselves to be taken for food in exchange for specific acts of respect.
- All social control was within the realm of the family elder. No outside body was believed to have dominion over an individual.
- Affiliation, like identity, was primarily with the family of origin, even after marriage into another family. In addition, men had hunting partners (usually these were near relatives) and both men and women nurtured lifelong age-grade friendships. On the wider scale, men had trading partners and people sometimes intermarried with other social and linguistic groups, but bad feelings sometimes escalated, with war likely to result.

1.2.2 Beginning Step 2

We use values to start making connections to a DIME/PMESII construct.

- Values are the underlying motivation and rationale for human behavior.
- Values are more accurately identified through inference (moving from observed behavior to inferred value) than through verbal proclamation.
- Stated values might not coincide precisely with “enacted” or “performed” values. It is the latter that should become part of the model.

- A given group’s values, whether “logical” or not, affect behavior.
- Not only must the areas of importance (e.g., family, land), be identified, but the particular ways those areas are treated, according to the values.
 - For example, “sharing,” though seemingly universal, is in fact understood and carried out differently and to varying extents in different cultures.
 - An understanding of what (if anything) is considered sacred is essential
- Communication Dynamics
 - Communication conventions are variable
 - Verbal and non-verbal communication are equally important
 - Consider how children are taught and how they learn for a window into the understanding of the human psyche and mind
 - Learn what should not be discussed or referred to
- Variation within a given group is to be expected
 - Ranges in individual perspectives and choices
 - Ranges according to age, sex, status

1.2.3 Back to Step 1

The historical situation is necessary for understanding the current situation. There have been changes in values and behavior; however, old values and behavior continue to have an influence.

- Leadership is now elective (school board, village president, etc.), though family membership is still an important factor in who is elected.
- Family is still the primary social unit to which loyalty is owed.
- But within families, people prefer certain relatives over others.
- Land is now owned by individuals and Native Regional Corporations, though land use for hunting and fishing is still largely as in the past.
- Most people are Christian; many retain traditional cosmological understandings, but some consider them old-fashioned and superstitious.
- The authority of state law enforcement officials is acknowledged, but not always available, and not always the preferred method of resolving issues of social control.
- Families rarely exercise strict controls over their members; an individual’s right to dissent or act in a contrary manner is generally respected.
- The Sugpiaq people have been placed in governmental and economic groupings that are new to them. These include fishing unions and cooperatives, tribal governments defined by geography rather than kinship, and Native Regional Corporations that also include members of other ethnicities. In addition, the people consider themselves Sugpiat, Alaska Natives, Alaskans, and Americans; the order of their identification with and loyalty to those four categories varies from person to person. Affiliation is largely situational.

1.2.4 Back to Step 2

We now begin to ask questions about how new factors and programs (interventions) might be received.

- Leadership: Each family with something at stake will likely need to be convinced separately.
- Land use: Land title is not the only indication of how decisions are made about the land.
- Cosmology: Some actions that might affect populations of bears, for instance, might be considered spiritually dangerous.

- Social control: Even if all decisions are said to be acceptable to all families, individual rights to disagree will not be squelched.
- Affiliation: Whenever an outside entity attempts a change, all the various groups (listed above) that have a stake in the decision must be considered and approached for approval.

In proceeding with Step 2, several caveats are required in dealing with ethnographies and fieldwork experience. Because anthropologists are parts of cultural and social groups themselves, the ethnographies they describe might reflect the taxonomies (i.e., areas of cultural importance) of the ethnographer rather than the subject group. One must attend to the methodological statement in ethnographies to determine how categories were derived. We would recommend that one begin with cosmology, then move to values. Remember: GIGO (garbage in, garbage out); qualities of ethnographies vary.

Similarly, in observations of behaviors there are caveats. Good ethnographies describe behavior, including individual and group motivations and long-term ramifications of various choices. These are the examples that will yield the best information (“thick description”, as conceived by Clifford Geertz [3]). Ethnographies are generally anecdotal rather than statistical, descriptive rather than proscriptive.

Also it is important to understand the anthropologists’ code of ethics. Any research conducted during the last 20 years using federal grants or under the auspices of a university has been approved by an IRB (Institutional Review Board) that upholds the rights of those being studied. The researcher must abide by the IRB agreement even after the research period. IRB agreements prohibit undertaking social “experiments” that might have adverse effects on those being studied, without explicit signed permission of those being studied. IRB agreements do not prohibit analysis, but the potential uses of the analysis can be a factor in whether the anthropologist will take part in the exercise. A recent ruling states that ethnographic or oral history studies that are not likely to be generalizable are not covered by IRBs.

1.3 DESCRIBING THE MODEL FROM THE COMBINED APPROACH

At this point, we can produce a diagram that is similar to that of Figure 1, but modified by the anthropological approach. In Figure 3, the PMESII descriptions of the starting situation and the desired situations are separated from the model (“Interactions” box) by corresponding cultural values descriptions, with bridges between the corresponding descriptions.

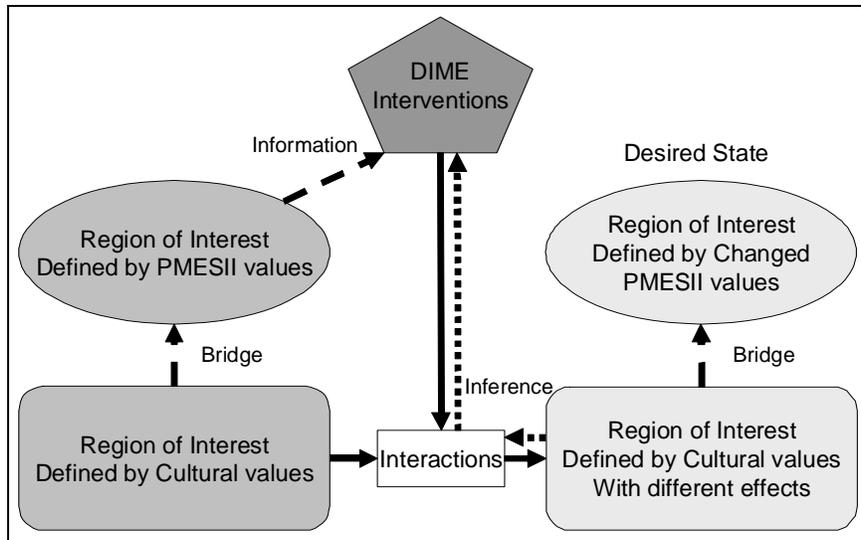


Figure 3. DIME/PMESII Model: OR-Anthropology Version - 1

The flow of information about the starting situation flows from the cultural description through the PMESII description (not the other way) and the inferences flow from the PMESII description, over the bridge to the cultural description and through that description. The model interactions are defined at the cultural description level, not the PMESII description level.

Figure 3 is actually a simplified version of the model. As was noted above, even single “cultures” have variations and most countries are made of several cultures. Further, any given intervention will not only affect each of these variations somewhat differently, but also it will only have probabilistic effects or outcomes. Figure 4 illustrates these complications.

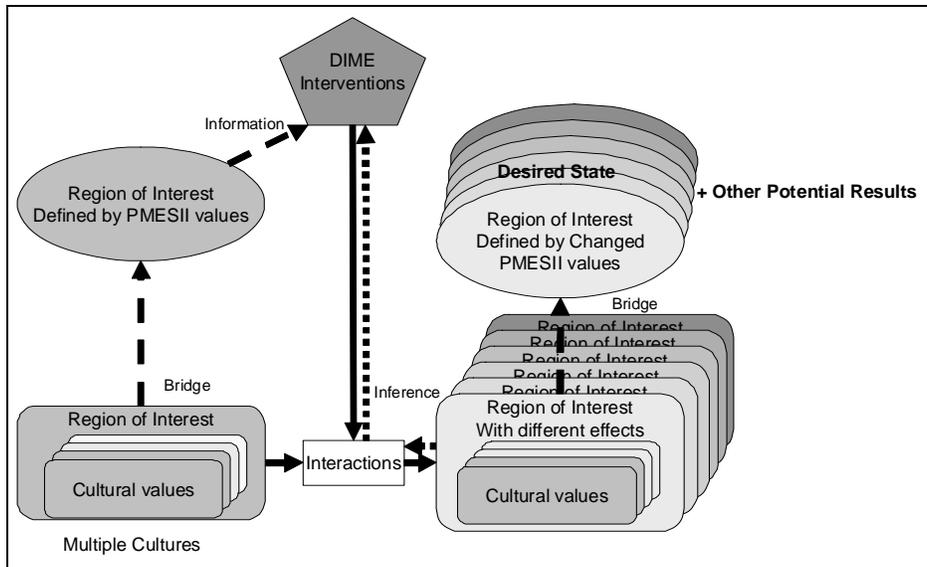


Figure 4. DIME/PMESII Model: OR-Anthropology Version - 2

We are also now in a position to expand on the problems of Step 2. As shown in Figure 5, Step 2 includes the connection between the anthropological model and the DIME/PMESII variables – and so far we have still left a large part of this to the prototypical mathematical proof in which the mathematician hasn't a clue about how to proceed and says, "magic happens," here.

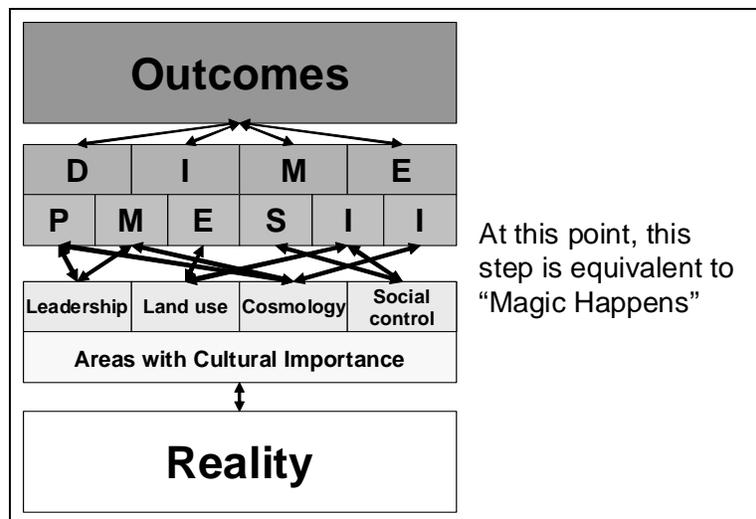


Figure 5. Layered Approach - 2

Figure 6 begins teasing apart the process of making the connections. The ethnographic data are represented as numerous sets of statements about areas of cultural importance that are relevant in some way to the situation. The first step is not glamorous, but is necessary – the data must be gathered together.

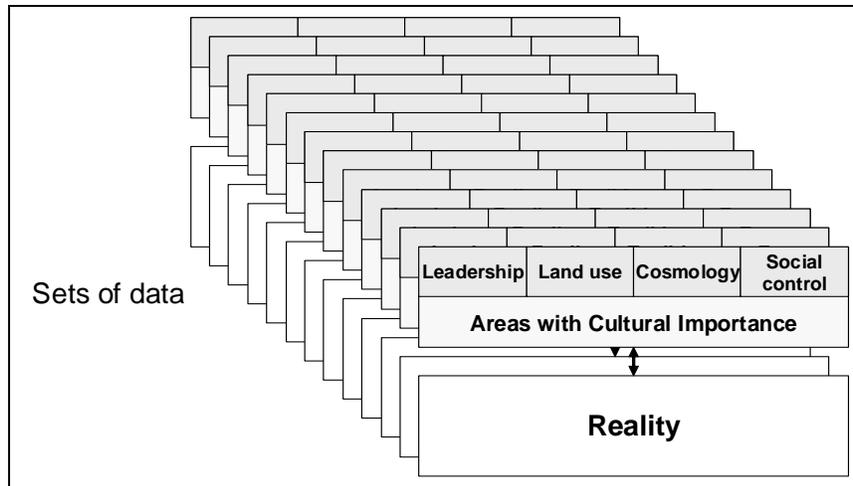


Figure 6. Layered Approach - 3

The second step is equally non-glamorous and is harder. As shown in Figure 7, the sources must be read and analyzed. An anthropologist must discard duplicates (while deciding whether the duplications warrant added weight for the model or not) and organize the remnants into a coherent model.

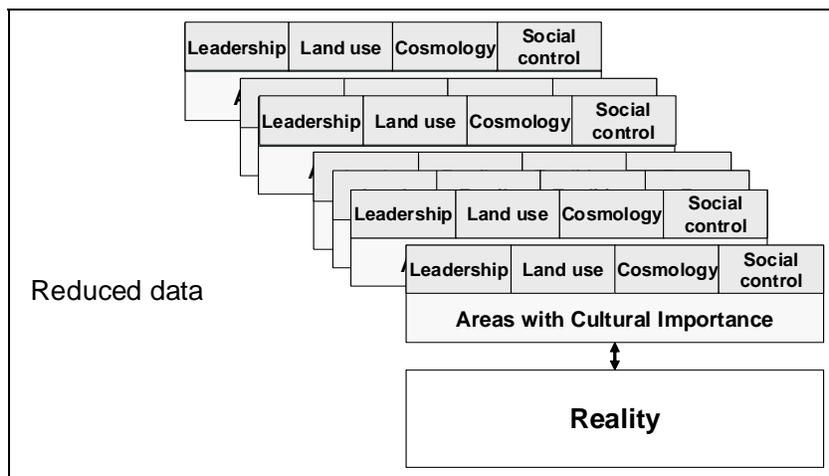


Figure 7. Layered Approach - 4

Figure 8 and Figure 9 are two parts of a single step (with another step, to be discussed, also included in the latter figure). In the former figure, the potential connections to the DIME/PMESII variables are considered and in the latter figure, the connections are made.

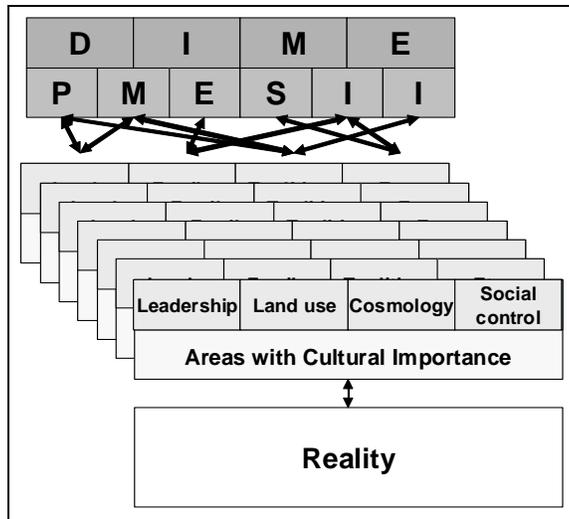


Figure 8. Layered Approach - 5

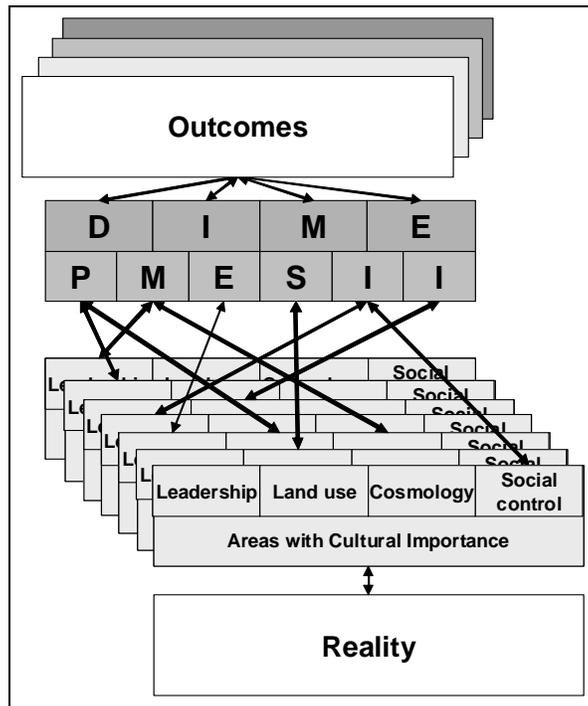


Figure 9. Layered Approach - 6

Figure 9 also contains the connections of the DIME/PMESII variables to the outcomes. This is not the same as the model – this is the interpretation of the situation in more useful terms (e.g., lessened violence, increased governmental services, etc., is “good”).

1.4 WHY BOTHER?

The process of building a model that is clearly very dependent on a particular situation poses a cost-benefit question. For example, consider the following sample problem: Businesses of various sorts

would like to build a bridge between “here” (in Alaska) and an island, currently served by a ferry. What will be the impacts?

- Impact on conventional economy, ferry operator, real-estate agents, people living on island, etc.
- Environmental impact statement
- Impact on Native Alaskans who own lands on island

One Solution:

- Hire a consultant to do the conventional economic impact.
- Hire another consultant to do the environmental impact statement.
- Hire an anthropologist to figure out impact on Native Alaskans.
- Where is the need for a model?

A second problem describes another situation, one in which the benefits of a model are clearer. You will be in the neighborhood for the next 5-10 years and you will be changing the neighborhood in numerous ways, some optional, some not. You have some leeway in adding ameliorative projects. You have some leeway in hiring locally and contracting locally vs. faster but externally sourced contracting and/or labor. You will also be fiddling with government and economic institutions. It won't really be you, but several successive people like you who will be there over the 5-10 years. What will be the impacts? Which things should be done in which ways? Which shouldn't be done? What should be added?

One Solution:

- Hire several “experts.”
- Tell them that some projects will allow months of study and others will only allow a day.
- Tell them that the time category into which a project falls may change at any time.
- Tell them you also need to know what the sequence of projects should be.
- Tell them this planning will have to be re-done regularly because you won't always take the advice and projects will be randomly cancelled, extended, damaged, and modified.
- Tell them that even if each project only allows a single day for study, the number of projects exceeds the number of experts times the number of days in the 5-10 year period.

Another Solution:

- Build supporting models.
- Hire experts to use the models to compress the amount of time that would normally be required to study the problems and estimate the impacts and make recommendations.

1.5 OVERALL CONCLUSIONS

Two questions remain: where is the “Interactions” model and how do you make the connections? The model is in the connections. And unfortunately, there is still some “magic happens” in the process.

So far this has been a “thought experiment.” It will have to be tried to find out whether it can be done. This trial is necessary to discover where the “if this happens, then these things might happen” hypotheses come from. It remains to be seen whether enough of these hypotheses can be generated to span the space of life events and whether it will be obvious when the process is complete, if it is. On the other hand, without incorporating this type of information, future externally driven projects will only result in desired outcomes to a modest extent, since so many essential and determining factors will not have been considered.

This creation process is still greatly simplified and the actual work involved is greater than indicated. The description leaves out parallel efforts in economics, infrastructure specialists and other specialties. However, it uses the strengths of each discipline without requiring everyone to know everything. It also allows for the use of previously gathered data, avoiding excessive calls for new data collection.

There are precedents -- see Ruth Benedict's *The Chrysanthemum and the Sword* [4], for instance, designed to help the US Army deal with Japan's reconstruction after World War II. This process's greatest strength is that, to the extent possible, it is "data-driven," creating theory from the data, rather than "theory-driven," defining the solution to fit one of many theories of uncertain relevance or kludging several theories with forced connections.

Modeling's greatest strengths are

- It multiplies the ability of a limited number of experts to help;
- It allows for general improvement over time as the model's weaknesses are observed and improved;
- Its mechanical nature avoids the problem of forgetting to consider a factor; and
- It provides consistency of application.

Modeling's greatest weakness is that it is no better than the algorithms that are put into it (validity issue) and can be worse because of "bugs" (verification issue).

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