

Informing enforcement

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Abstract. Environmental Protection, Policing, and Tax Collection are all undergoing significant strategic changes. It is useful to examine all three professions together. All have been traditionally thought of as “enforcement functions”. The cultures of these professions, the stresses under which they find themselves, and the kind of strategic changes they are pursuing, all have striking similarities.

This paper identifies common factors in the emerging strategies of these three professions, including: strategic targeting of enforcement actions; adoption of a “project mentality”; use of a broader range of tactics beyond traditional enforcement actions; and emergence of new partnerships with the public and with other agencies of government.

General lessons can be learned about the ways in which information management is changing, or should change, in order to support these new ways of doing business.

1. Introduction

Properly managed, information systems can serve as a powerful tool in the hands of executives: they can cut labor costs, improve resource allocation, and increase efficiency and effectiveness of existing operations; they can also help to redefine work, emphasize new values, and facilitate the development of new partnerships.

But, if badly managed, they can frustrate managerial purposes, enshrine old values, focus attention on outdated and inappropriate performance measures, give power to the wrong people, cast in concrete old ways of doing business, create false or misleading public expectations, destroy partnerships, and impose crippling restrictions on new styles of operation – quite apart from their propensity to consume millions and millions of tax dollars.

The organizational effects of information systems are no longer limited to efficiency gains. It is now no longer possible to separate organizational strategy from information technology strategy. In information intensive businesses the two must go hand in hand.

Environmental Protection, Policing, and Tax Collection are all information intensive businesses. Moreover they are all undergoing significant strategic changes. They all have to work out what kinds of information management will support rather than impede their emerging strategies.

It is useful to look at these three – environmental protection, policing, and tax collection – together. All three are “enforcement functions”: that is, they are in the business of delivering legal obligations of one kind or another to citizens or institutions. Their task is to deliver those obligations in a manner which is effective, but economical with respect to the use of public resources and the exercise of authority.

The cultures of these professions, the stresses under which they find themselves, and the kind of strategic changes they are pursuing, all have striking similarities.

The traditional cultures of Environmental Protection, Policing and Tax Collection incorporate a classic enforcement mentality, built upon the fundamental assumption that a ruthless and efficient investigation and enforcement capability will produce compliance through the mechanism of deterrence.

In each of these three fields the traditional “enforcement” approach is under stress. There are too many violators, too many laws to be enforced, and not enough resources to get the job done. Lining up industrial polluters for prosecution has limited tangible effect on the quality of the environment. Making numerous arrests seems to be more effective in jamming up the criminal justice system than in reducing crime. And, given the small capacity for conducting audits within tax collection, the deterrent effects of possible prosecution seem extremely limited.

Agencies in all three of these businesses feel swamped: environmental agencies by the range and variety of regulations which they are required to enforce, and the overwhelming size of the regulated communities; the police by the insatiable demands of the 911 system, which keeps them scurrying from call to call; tax collection agencies by the sheer volume of returns to be processed, and the impossibility of examining more than a tiny handful in any detail.

It seems that these three fields seldom have the opportunity to learn from one another’s experience. This paper should show there is much each could learn from the others.

This paper has two purposes. First, to identify common factors in the strategic evolution of these three professions. Second, to extract general lessons about the ways in which information management is changing, or should change, in order to support that evolution.

2. Emerging enforcement strategies

The following three sections describe very briefly the strategic changes currently underway in each of the three professions. These short sections are intended only to give an indication of the major issues exercising senior executives and a flavor of the “movements” commanding most attention within each of the three fields. Later sections will then extract common themes in their strategic evolution and then draw inferences regarding future requirements for information and analytic support.

2.1. *Environmental protection*

When William Ruckelshaus became the first Administrator of the U.S. Environmental Protection Agency (EPA) in 1970 he selected the phrase “Pollution Abatement” as his mission statement.¹

In 1990 the language of senior EPA officials includes, instead, “pollution prevention”, “risk management”, “cross-media integration” and “managing for environmental results”.² To many these phrases signal important new ideas about the business of environmental protection, about its ends and about its means; they are championed by William Reilly, EPA Administrator since 1989; they signal a shift in the strategy of environmental protection.

Initiatives now being pursued by EPA Headquarters are predicated on the assumption that environmental agencies will have to change the way they do business in at least three important ways: first, they must break out of strict programmatic straitjackets (water/air/hazardous waste etc.) in order to do cross-media risk analysis and problem solving; second, they must focus on environmental impact rather than on the more traditional “bean-counting” output performance measures; third, they must draw the public into the decision making process through providing public access to data.³

Cross program integration. When EPA was formed in 1970 from a number of disparate programs the Congressional oversight arrangements were never integrated. EPA Headquarters staff remain primarily disaggregated along program lines.

The need for cross program integration is now obvious. It is mandated by the advent of new environmental problems – for example, global warming, acid rain, the toxics problem in the Great Lakes – that do not fit neatly into any of the existing boxes.

Divisions within EPA Headquarters are mirrored by similar divisions within the EPA Regional Offices and within almost all State agencies. The strength of the programmatic divisions present a constant challenge for the proponents of a more intelligent and more analytical approach to risk identification and priority setting.

From the programs’ perspective, the relentless pressure of legislative mandates and deadlines all too often makes such esoteric concepts as cross-media integration look like dreamy distractions from the important work in hand. In fact the term “cross-media integration” is sufficiently vague that it gets used to describe a number of different issues.

First, it is clear that little useful purpose is served by a single-medium program causing industry, through enforcement efforts, to merely shift its pollutants into some other medium.

Second, environmental agencies increasingly try to coordinate enforcement activities across programs: both to make the most economical use of inspection efforts, and also to produce the most efficacious decisions as to prosecution or advice.

Third, there is the question of how data integration across programs and media can improve the prioritization of problems through integrated risk assessment.

Managing for environmental results. The extent to which Managing for Environmental Results can become a practical reality for EPA within the foreseeable future is somewhat obscure. The Program Staff at EPA recognize Reilly's commitment to it, but still feel the compulsion to maintain or increase the numbers of judicial referrals as a method of demonstrating their productivity.⁴

There seem to be two major obstacles facing any major shift towards managing for environmental results: first, the scientific problem of establishing meaningful measures of environmental quality (which, especially in the case of water bodies, is extraordinarily difficult); and, second, the necessity of reeducating not only agency staff but the legislatures, the media and the public as to appropriate new forms of accountability. The scientific debate about the first and the political debate about the second are active and vigorous.

Public access to data. While EPA continues the struggle to design more meaningful indicators of environmental quality and better measures of environmental impact, it simultaneously has to deal with ever increasing public interest in environmental affairs. Senior EPA officials describe EPA's past attitude to data as being secretive and possessive,⁵ and appear ready to engage in broader public dissemination of data.

The most significant recent initiative in this area (albeit mandated by law) concerns toxic discharge data. The EPA's database on toxic discharge data became available on-line in 1989 through the National Library of Medicine. Using a PC and modem anyone can access the files on 17,000 different manufacturing facilities across the country. Included are emissions to each media on an annual basis. The "Toxic Release Inventory", as it is called, contains data on over 300 different toxic chemicals, and has a total of 75,000 records, submitted by industry itself.

Officials of EPA's Office of Toxic Substances, responsible for directing this implementation, released the data without editorial of any kind, not counting the EPA responsible in any way for public misinterpretations of the data. Rather, they viewed the data as being public property from the moment it was released to government by industry. So the burden of educating the public as to how to interpret the data had to be shared by the chemical industry itself. The result, according to a senior EPA official, was that the industry began a meaningful dialogue with the public about the data, rather than stonewalling. "The result has been more two-way communication [between public and industry] about toxics in the last year than we've ever seen before".⁷

2.2. *Policing*

The enforcement mentality forms an important piece of traditional police culture, too. Police have come to view themselves as the "professional crime fighters", and have attached the highest kudos to dramatic arrests for serious crime. Putting criminals behind bars has been a principal strategy of police departments, using three primary tactics: random patrol, rapid response to calls for service, and retrospective investigation of crimes.⁸

Police tended to blame the other parts of the criminal justice system – slow or lenient court systems, insufficient jail space, inadequate safeguards on parole – for any failure of their strategy to stem rising crime rates. Insofar as police fed the criminal justice system through numerous arrests, they felt they had made their contribution to the safety of the streets.

These traditional police tactics attracted much criticism. Police were seen as distant, out of touch with the real concerns of citizens and communities, disrespectful of citizens' rights, sometimes brutal. The technology designed to facilitate rapid police response (cars, radios, and a centralized dispatching operation) seemed to isolate officers yet further, keeping them for the most part in fast moving cars. Police processing of work, on a call by call basis, appeared superficial and ineffective. They seldom had the opportunity to spot patterns or to contemplate the underlying causes of problems, and they never had the time or the obligation to generate creative solutions.⁹

These pressures are common to policing in the U.S., Canada, the United Kingdom, Australia and New Zealand – which all share a common model of policing. In response to these pressures progressive police departments are adapting the way they do business. They place increased emphasis on the importance of citizen contact. They increasingly allocate officers to geographic territorial beats, making them the single point of contact or “general practitioner” of community based policing schemes. They de-emphasize the importance of specialized functional squads, in some cases returning specialists to patrol duties.

Police Management is turning its attention to “managing through values” rather than continuing to rely on militaristic adherence to a predetermined set of rules and regulations.¹⁰ They are recognizing that police work requires the exercise of discretion, judgment and creativity at all levels, and is neither mechanical nor predictable.¹¹

This movement in police policy and practice goes under a variety of labels including community policing, problem-solving policing, and neighborhood-oriented patrol. It often produces new patterns of police deployment such as one-officer one-beat schemes, patrol team responsibility for broader geographic territories, or simply an increase in the level of foot or bicycle patrols.

It is a mistake, however, to regard the important development as the emergence of new patterns of deployment. The current runs much deeper than that. A new philosophy of policing is emerging, following reexamination of both the ends and the means of policing. Individual Police departments, and the profession of policing more generally, are rethinking the basic mission of policing, its operational methods, and its organizational structures.

Two ideas have emerged from this turmoil as particularly influential: community policing and problem solving policing. They are not the same. Nor are they mutually exclusive. They are compatible, can be complimentary, and have emerged as partners in many departments.¹²

“Community Policing”, as a term, focuses attention on a police department's partnership with the communities it serves. It seeks to revitalize that partnership for two major reasons: first, to produce a cooperative process of identifying police

priorities and, second, to provide a more effective method of achieving those jointly nominated goals. It tends to broaden the scope of police actions, and it tends to distribute more widely the responsibility for producing results. It frequently necessitates new alliances between police departments and other agencies of city government, as police come to regard themselves more as contributing to the safety and quality of urban life, and less exclusively as the feeders of the criminal justice process.

“Problem Solving Policing”, as a term, focuses attention on redefining the nature of police work. It stems from a conviction that police “incidents” are symptoms of underlying problems, usually soluble, and that policing becomes more effective when it pays attention to the problems rather than treating each incident in isolation. It places emphasis on the longer term impacts and effects of police actions. It seeks to identify patterns among the myriad calls for service. It redefines the basic unit of police work from “incident” to “problem”.¹³ It also acknowledges a wider variety of problems as being appropriate for police attention.

Problem solving policing allows for identification of problems on many different scales and in many different dimensions.¹⁴ It encourages the use of creativity and imagination by officers of all ranks. It looks for careful analysis of the nature of a problem, identification and weighing of all relevant interests, careful selection of the most appropriate solutions, and systematic monitoring of the effectiveness of action taken.

Many departments have embraced both of these major ideas, and in no way feel the need to choose between them. Successful police innovations which go under the name of Community Policing are revealing the power of partnerships. Those that go under the name of Problem Solving Policing are revealing the power of thoughtfulness and analysis when applied across the whole spectrum of police activity.

The terms “community policing” and “problem solving policing” do not cover all the various types of progress that different police departments are currently making. But together they do capture the essential elements of a movement in policing philosophy and practice which appears to be of growing significance.

2.3. Tax collection

As with policing and environmental protection, the operational pressures on the IRS are enormous. In any one tax year the IRS expects to process 200 million tax returns and more than 1 billion information return documents; send out refunds to more than 80 million taxpayers; handle more than 40 million letters and 36 million telephone calls; conduct at least a million examinations and initiate roughly 3 million collection actions ranging from bank levies to property seizures.¹⁵

The projected tax gap (difference between taxes due and taxes paid) for 1992 is \$113.7 billion.¹⁶ Despite the magnitude of that figure, the deficits are scattered over such a broad range of taxpayer categories that pursuing individual enforcement actions would not, in most cases, be cost effective. Hence the need for IRS to develop a strategic focus to enforcement efforts, an effective targeting capability, and a broad range of responses to noncompliance patterns.

Fred Goldberg, Commissioner of the Internal Revenue Service (IRS) since 1989, addressing a Congressional subcommittee in July 1991¹⁷ described the essence of a strategic reform process upon which the IRS has embarked. Speaking of “a decade of fundamental reform”, with the emphasis on “improving voluntary compliance” his comments regarding enforcement policies could equally well apply to environmental protection or policing:

“At present the focus of our compliance effort is principally after-the-fact, case-by-case enforcement. Examinations, collection actions, and criminal investigations are, and always will be, an essential part of what we do; indeed they should be expanded in the years ahead. But they cannot be pursued in a vacuum. We are changing the way we approach our compliance activities. We are devising, implementing and assessing comprehensive [new] strategies to improve voluntary compliance – strategies that combine traditional enforcement actions with education, outreach, and simplification of regulations and legislation. The ultimate objective is not to maximize yield through costly, intrusive, and burdensome enforcement efforts. The objective is to enhance voluntary compliance.”

Renewed attention to customer service is central to IRS’s strategic reorientation. IRS began providing assistance to taxpayers preparing returns in the 1950’s. But “Taxpayer Services” became organizationally separate from collection activities only in 1974, and acquired its own Assistant Commissioner at Headquarters in 1989.¹⁸

Experiments with provision of toll-free numbers began as early as 1971, but the accuracy and reliability of information given out from IRS call centers remained extremely poor into the late 1980’s. A 1988 GAO report, showing only a 64% accuracy rate, was a serious embarrassment to IRS.¹⁹ In 1988 the IRS introduced its own internal survey procedure, the Integrated Test Call Survey System (ITCSS), to sample the accuracy of taxpayer advice. The ITCSS results are now published weekly, and are incorporated into the district chiefs’ performance measures. In 1991 the national average for response accuracy was closer to 90%.

Goals that Commissioner Goldberg has for the IRS, incorporated into the proposals for Tax System Modernization, include:

- “one-stop service” for taxpayer enquiries, where 95% of queries can be answered in full by one operator, minimizing referrals;
- resolution of at least 80% of any taxpayer’s questions during the first conversation;
- provision of current, complete and accurate account information to IRS front line employees and taxpayers;
- admission of oral statements by taxpayers as a convenient method of entering data or queries into the system;
- improved public information dissemination about IRS processes;
- development of more sophisticated tools for discovering non-compliance patterns from data already in IRS possession;

- design of tax forms which would simultaneously satisfy federal and state requirements; and
- development of a project approach to major compliance problems.²⁰

Organizational steps supporting the process of change have included establishment of the “Compliance 2000” Project, establishment of high-level working groups including one entitled “One-Stop Service”, customer service training, and cross-functional training.

The IRS knows that each 1% increase in voluntary compliance produces an extra \$5 billion in revenue. So the central thrust of their emerging strategy is to inculcate in citizens a heightened sense of responsibility towards taxes. They realize that the best approach to enforcement, as in Policing and Environmental Protection, is to minimize the need for it.

Often state agencies can learn faster and move quicker than their federal counterparts. The EPA was strongly influenced by the experience of some pioneering state agencies (Georgia, for example²¹). The IRS too has the opportunity to examine the experience of pioneering agencies at the State level embarked upon similar strategic reorientation.

California and Massachusetts, for instance, are both known for their organizational commitment to promoting voluntary compliance.²² Both use strategic targeting of enforcement efforts. Both have professional media liaison operations designed to support carefully crafted public images of their agencies, their policies, their procedures, and their investigative capabilities. Both have almost 100% conviction rates for cases taken to court.

The “Franchise Tax Board” of California targets both the number and types of cases accepted for investigation at a given time.²³ The Criminal Investigation Bureau’s Annual Plan in Massachusetts targets resource allocation to certain industries, trades, tax types, geographical regions or suspicious taxpayer behaviors for special proactive investigations.²⁴

There are significant differences in organizational philosophy and structure between the Californian and Massachusetts agencies. But, in both states, cases are not accepted for full investigation unless prosecution is almost certain to be successful, the publicity generated is almost certain to be favorable, and the pursuit of the case fulfills some identifiable strategic purpose.

3. Strategic changes in enforcement practice: common themes

The intention here is not to prove the case for pursuit of any of these strategic changes – that job has been adequately done elsewhere – but to observe them, note their common features, and consider the consequences for information support. The most significant common elements are as follows:

Nature of objectives. Objectives describing outputs and efficiency give way to objectives describing impact and effectiveness. Environmental agencies specify tar-

gets describing the quality of the environment both in terms of its chemical or biological content and also in terms of its ability to support human and biological communities. Tax agencies set targets in terms of levels of voluntary compliance. Police set targets in terms of levels of community safety, both perceived and real.

Performance measures used. Aggregate measures regarding enforcement actions are de-emphasized. Speed of reaction after the fact is considered second best; prevention is considered better, but it is extremely difficult to measure. Levels of reported non-compliance come to be considered unreliable, as the degree of public willingness to report crimes or non-compliance depends so heavily on the degree of public confidence in and support for enforcement agencies.²⁵

More sophisticated methods for determining actual, rather than reported, levels of non-compliance are sought. All three professions are finding it enormously difficult to design, and win acceptance for, appropriate new measures of effectiveness.

Unit of work. The important unit of work is being redefined from individual “incidents” or “violations” to broader “problems” or “risks”. Problems can be specified in terms of geography (worrisome locations or regions), time (temporal patterns to behavior or effects), categories of violators, categories of victim, or categories of behavior.

Emergence of ‘project’ focus. The identification of any problem, in any one of these several dimensions, is followed by a series of organizational efforts designed to address it.

“Problems” can be nominated at different levels within the department, and might be called projects or programs if they are sufficiently large. In policing, for example, at one extreme a small localized problem might be handled by one officer and be dealt with within a week. At the other extreme a major program might require considerable departmental resources over a protracted period, might span several different districts or regions, and might require senior management direction and control.

Range of tactics. Whatever the scope of the problem, the range of tactics available is broadened considerably. No longer is prosecution the only, nor necessarily the primary, tool available. More emphasis is placed on education, dissemination of information, building citizen commitment and responsibility, establishing partnerships with other agencies of government, and negotiating resolutions.

Strategic selection of enforcement targets. Enforcement actions and prosecution are undertaken selectively, in the context of a strategy to procure voluntary compliance and a desire to develop cooperative partnerships with the public. This involves the application of strategic as well as judicial filters in case selection.

Organizational structures. Functional specialization is de-emphasized. Invest-

ments are made in cross-functional training, especially for front line staff. Amongst mid-level managers, organizations struggle to identify the appropriate mechanisms for integrated, cross functional risk assessment and problem identification.

View of the public. Agencies reconsider the nature and importance of their relationships with the public. Compliance depends upon public confidence and support for the organizational mission. The public come to be seen less as the “regulated community”, more as “clients” and “partners”. Agencies seek out, mobilize, and empower public energy and commitment. They soon discover that commitment to public partnership requires the setting up of collaborative processes for evaluating risks and agreeing priorities. Old ideas of “professional autonomy” subside.

New emphasis on customer service. The redefinition of clientele, coupled with a new awareness of the value of a positive organizational image, produces a desire to satisfy, even impress, customers. A concern for responsiveness, coherence and customer convenience pushes the agency towards provision of “general practitioners”, “single point of contact”, and “one-stop service”: all measures that mitigate the normally wretched experience of dealing with massive governmental bureaucracies.

Continuing need for specialist enforcement function. Despite the new strategic context for enforcement and prosecutorial functions agencies discover the need to preserve, even enhance, their capacity to deal with the worst offenders. Any perception that the worst violators are “getting away with it” turns out to be enormously destructive for the agency’s credibility, for the morale of its employees, for the norm of public self-compliance, and for the credibility of the strategic change process.

Continuing operations. In all three fields, agencies face the impossibility of closing down operations while they redesign and restructure their work processes. The unrelenting operational pressure leaves little energy or time to invest in transition. Reaching agreement on the right way to do business does not guarantee the development of the requisite organizational capacity.

4. The development of information support

Under the traditional enforcement approach the nature of information support required was relatively straightforward: the operational information associated with each individual transaction or incident had to be handled expeditiously; and periodic data aggregation had to be performed for reporting purposes. Provided information systems did not hold up agency response on a case-by-case basis, and provided the data aggregation was accurate and timely enough to satisfy overseers, all was well.

The emerging strategies are much more demanding. The processes of problem identification, risk analysis, prioritization, and impact evaluation depend heavily on information and each require carefully crafted information products. There was nothing in the old strategy that required such flexibility, creativity, or complexity.

Of the three professions examined here it is environmental protection which is furthest ahead in adapting its information support. The EPA realized early on that data management planning had to be inextricably tied to strategic planning. Much of the impetus for strategic reorientation within both the federal and state agencies has come from the "State/EPA Data Management Program", a nationwide cooperative effort to transform information support, formally initiated in 1985 with strong support from then Administrator Lee Thomas. That program was modelled on the previous experience of the Georgia State agency and was divided into two distinct phases.²⁶

Phase I ("Data Sharing") concentrates on the establishment of the physical network infrastructure and cooperative relationships and understandings necessary to ensure provision of "complete, accurate and timely data". The plan is to have the state agencies use on-line access to the EPA's national databases, thus improving the accuracy of the data, and making sure that the federal and state agencies are working from a common set of facts. The overall purpose is to modernize and restore the integrity of the nation's environmental data systems.

Phase II ("Data Integration") is more concerned with making intelligent use of the data once they are available. Phase II goal's include the provision to EPA and to the States of the data, methods and technology required to conduct integrated environmental analyses and to plan and manage cross-media programs; also to build effective, long-lasting arrangements for sharing data and technology between environmental agencies at all levels and with other government agencies responsible for commerce, agriculture, science and natural resources conservation.

Policing and Tax Collection have shared the concerns, embodied in Phase I, for updating and modernizing data management infrastructures in order to provide reliable data support for operations.

The IRS refers to the "American Express" factor, where customers expect IRS staff to have immediate on-line access to complete account information, and to be able to make corrections, enter queries, and provide updates in real-time. Plans for providing IRS with such capabilities are incorporated into their major plans for Tax System Modernization.²⁷

The Police version of Phase I centers on the provision of computer aided dispatch systems to control and record the disposition of police resources, backed with appropriate incident logging facilities. The idea is that the system, interrogated anywhere, can give up-to-the-minute histories on any incident or crime.

Tax Collection and Police agencies have made less progress with the risk analysis and project-supporting concepts of phase II.

Even the EPA acknowledges that progress on Phase II has been patchy, often depending on the technical sophistication and organizational cultures of local state partners. Even where technical adoption of Phase I's data-sharing provisions has

progressed smoothly there is no guarantee that the fundamental purposes and significance of Phase II will be understood.²⁸

Likewise in policing: implementation of state-of-the-art computer aided dispatch and incident logging systems do not in any way guarantee the adoption of a problem-solving approach to policing,²⁹ and can in fact inhibit it.

In Environmental Protection the establishment of Geographic Information System (GIS) units (both in EPA regional offices and within state agencies) has provided much of the momentum for Phase II. The usefulness of Geographic Information Systems for risk assessment lies in their capacity for integrating data from different sources and presenting the results in a coherent, and interpretable format. GIS units, where they exist, tend to become the focal point for cross-media data integration, and also the principal source of information products tailor-made to support specific managerial decisions.

The shift in focus from provision of data to the manufacture of information products is an important one. Information and data are very different commodities. Information products are as different from raw data as a table is from a plank of wood. Data are the ingredients, the raw materials. Information, on the other hand, is the final product. Information products, like chairs and tables, have form and style; they are designed for a purpose, with a user or class of user in mind; they often incorporate raw materials from many different sources; and a great variety of tools and methods are used in their production.

Good quality data only has to be accurate, up to date, and maybe, in some sense, complete. Good quality information has to be relevant, useful, comprehensible, well designed, appropriately structured, appropriately presented, and in the right hands.

The emerging strategies cannot be adequately supported by a “data warehouse”. These enforcement agencies are already awash in data. Intelligent risk analysis and problem-solving has to be supported by an “information craft shop”, and by “information craftsmen”.

3.1. Common themes and lessons

The following common themes emerge regarding the way information support needs to be transformed.

Problem identification. Regional and national aggregation cannot remain the dominant form of analysis. The clustering of incidents to form a “problem” or “risk” might occur in any one of several different dimensions – geographic, temporal, offender class, victim class, behavior type, modus operandi, and so on. So the process of analysis of incidents comprising any one problem will require the facility to aggregate and disaggregate incident data along one, or any combination, of these dimensions. That requires flexible database structures with versatile access and analytic capabilities.

It will also require the ability for analysts, working on a project basis, to extract such data from the major operational systems, (maybe downloading data onto

Personal Computers) and then to experiment with analyses of different types. As the IRS "Compliance 2000" plans declare:

"Future efforts to deal with non-compliance will focus on a system that identifies patterns and trends of noncompliance much earlier than our current efforts; analyzes this noncompliance in the context of cause and effect; develops organizational solutions to optimize the impact on compliance and the most effective use of resources; implements the solutions; and measures implementation results, both direct and indirect."

Range of scopes. The information and analytic support for risk identification, risk selection, problem-solving, and resource allocation will be required at many different levels – ranging from support for one-off street-level problems dealt with by a single agent or Field Engineer, to major and protracted national priorities.

That means that information management resources (analysts and equipment), will need to be deployed flexibly, on a project basis, in teams of many different sizes.

Support broader range of tactics. Agencies' information and analytic support has to be mobilized in support of a broader range of agency activities and goals. Public partnership may result in the nomination of new priorities not previously considered a part of traditional enforcement efforts. And many tactics other than enforcement will be used. So the information management personnel need to be convinced of the importance of supporting activities such as public education programs, partnership building, or building inter-agency cooperation.

Status for analysis and analysts. The new strategies demand that the skills of analysis be given a higher profile, more akin to the recognition afforded analysis (as a basis for professional judgment) in the fields of medicine, defense, and intelligence. Vital skills include identifying sources of data relevant to a project, integrating the data in some useful way, using various analytical methods (statistical or graphical) to deduce relevant information from it, and then employing various methods of presenting the resulting information to others in a meaningful way.

There are some problems to be overcome here. First, there is a shortage of analysts in these professions. They have not been in such demand before. Often, particularly in policing, they have had low status. The strategic significance of analysis has seldom been acknowledged (which has been the constant complaint of intelligence analysts within law enforcement).

Second, the analysts that exist are accustomed to enjoying stable long-term assignments. They are not accustomed to the job-shop approach, and being reassigned frequently from project to project.

Third, analysts have traditionally been valued for their knowledge rather than for their skills. By remaining within one investigation or at one desk for long periods they became valuable sources of knowledge. The focus was therefore upon their capacity to absorb and regurgitate data, rather than upon their ability to de-

sign and create new information products through use of a broad repertoire of analytical skills.

Improvisation, creativity and innovation. Information and analytic support will have to be provided for problems that have never been identified before, which may not look like any previous agency business, which might not have any readily available data to hand, and which could turn out to be unique. Tailor-made information products will be required, often for use by project officers who are not information specialists. So provision and presentation of the appropriate information will require unprecedented creativity, improvisation and innovation.

Variety of data sources. The department or agency will, in many cases, not have (or not routinely keep) the data it needs to inform risk assessment and impact evaluation activities. Knowledge of outside data sources, the ability to design specialized data collection efforts, and the capacity to integrate external and internal data, will all become critical.

Monitoring impact. The need to assess the effectiveness of remedies implemented requires the design, on a project by project basis, of systems for measuring impact. That demands statistical and quantitative analytical skills not necessarily common even among information specialists.

Policy of active public dissemination. Increasing attention is paid to educating and thereby empowering the public. Information dissemination comes to be viewed as an effective way of empowering public partners, not a regrettable drain on resources. Release of appropriate information becomes a matter of conscious policy: active rather than passive. Freedom of Information Act requests cease to be the major prompt for information release.

New types of valuable knowledge. The range of data considered valuable to enforcement agencies broadens. Two new categories, previously unimportant, emerge. The first is knowledge of community resources, industries, professional groups and other external capacities that can be mobilized in support of particular causes or activities. The second is knowledge regarding sources of valuable data outside the agency, ways of obtaining it, and limitations on the uses to which it can be put.

Inter-agency data sharing. Procuring compliance is a much more cooperative enterprise than taking enforcement actions. The new strategies, insofar as they point towards the power of partnerships, demand a reevaluation of a department's policies regarding information sharing with other government agencies. Parochialism, possessiveness, and the clutching of information as a source of power should diminish.

Issues of confidentiality and privacy will remain, and public fears about government aggregation of data from different agencies will require serious attention.

4. Conclusion

It could be argued that the Phase I of the State/EPA Data Management Program and the equivalent efforts in policing and tax collection seek to perfect the traditional national data warehousing system. Also that Phase II, with its use of integrative tools such as GIS and with its focus on risk assessment and prioritization, introduces the information craft shop, elevating the status of analysis.

The implications for these enforcement professions are clear. First, Phase I efforts alone do not adequately serve the emerging strategies. The databases, complete, accurate and up-to-date, may well support routine operational transactions. But they are of no use to risk assessment and problem solving unless significant attention, resources and creativity are applied to generating useful and usable information products from them.

Second, the Phase II goals – creative and intelligent use of data in support of the emerging strategies – should never be made to wait for Phase I. The transformation of *strategy* does not depend on perfecting information infrastructures. Many information products supporting intelligent decision-making can be generated from data and tools currently available. But analysts need their agencies to grant them the license, and the obligation, to do so.

Notes

1. Wiehl, P. *William D. Ruckelshaus and the Environmental Protection Agency*. Teaching Case no: C16-74-027. John F. Kennedy School of Government. Harvard University. Cambridge. Massachusetts. 1974.
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