POLICE AND COMPUTERS - THE USE, IMPLEMENTATION AND IMPACT OF INFORMATION TECHNOLOGY IN U.S. POLICE DEPARTMENTS*

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I am going to talk about the use of computer technology in the United States. This relates a little to what David Mead talked about with respect to Canada, although I am not going to go into all the details of our results. Afterwards, I would be happy to refer you to specific publications.

Several factors have contributed to the growth of computer technology in the United States. First, I think that there has been a desire to improve the efficiency of police services. This has been coupled with, though, recommendations by the President's Commission on Law Enforcement and Administration of Justice which were made in 1967. The benefits of a number of technological innovations were discussed. That, in turn, was coupled - as we have already heard - with large-scale funding from the Law Enforcement Assistance Administration. This has helped to develop the use of technology in the law enforcement area. Finally, I think you have to give credit for innovation on the part of vendors who have gone from place to place to market their individual products. Sometimes they were interested in the results and sometimes not. Because of this wide application, a dialogue is now going on within the United States about the benefits and utility of technological innovation. Critics claim that many of the grants

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for technology have been wasted and that the innovations have done very little to improve the basic effectiveness of the law enforcement system. On the other hand, advocates are much more optimistic that the cost can be justified.

This report will focus on three questions or areas with respect to the present debate and dialogue.

THREE QUESTIONS ADDRESSED IN THIS PAPER

1. How are computers used by the police and how has this use evolved over time?
2. How successful has been the implementation of computer technology in the law enforcement area?
3. What is the impact of computer related technology? Do the benefits justify the costs?

The first area is how computers are used by the police in the United States and how this has evolved over time. This is related to what David Mead talked about in Canada. Secondly, I want to talk about how successful the implementation of computer technology has been and, thirdly, about the impact of computer use and whether the benefits justify the cost.

In asking these questions it is worth mentioning one caveat which I think is important. In addressing such issues researchers probe for understanding and explanations. Answers or relationships sometimes appear but often results uncover new questions and the

process of enquiry continues. I think it is important and healthy for all of us on occasion to admit that we are groping to one degree or another. So it is with the issues that I have indicated; some have clear answers, for example those that pertain to the use of computers by police and how this has changed over time. Other questions, though, particularly those pertaining to the implementation and impact of technology, are less straightforward. In some cases, the data are simply inadequate to reach a conclusion. In others, even if better data is available, a final decision would depend, I think, on perspectives and value judgements.

Now, with these caveats, let us begin to answer questions. Basically, I have three sources of information to help me in these three areas. First, I designed some surveys that were administered by the International City Management Association in 1971 and 1974 about the use of technology by police departments in the United States. Second, I have had the opportunity to visit a number of police departments. More recently, I have been engaged in doing a series of seven or eight case studies, with emphasis on resource allocation and command control systems in the United States and then implementation and impact.

First let me take five minutes to give you the quick history (the five-minute version) of how computer uses have evolved in the United States. In order to do this I need to define several terms. When the surveys were conducted, we asked people to say whether they were using a computer in any of 24 different application areas listed on the right in Figure 1. I then grouped these into eight areas on the left. I think that you are familiar enough with them that I do not have to go into detail. But let me simply indicate that we talked about police patrol and enquiry applications, rapid retrieval of information, traffic, police administration, applying statistical files, miscellaneous operations and so on down the list in Figure 1.

In trying to analyze the information, I found it was very useful to make a distinction, which I think some people have referred to in the last couple of days (maybe not quite in the same way) which I find very useful for the analysis of the impact and the success of the implementation. That is to make a distinction between what I call the "routine" uses of computers and the "non-routine" uses of computers (Figure 2). In the routine area, we consider straightforward

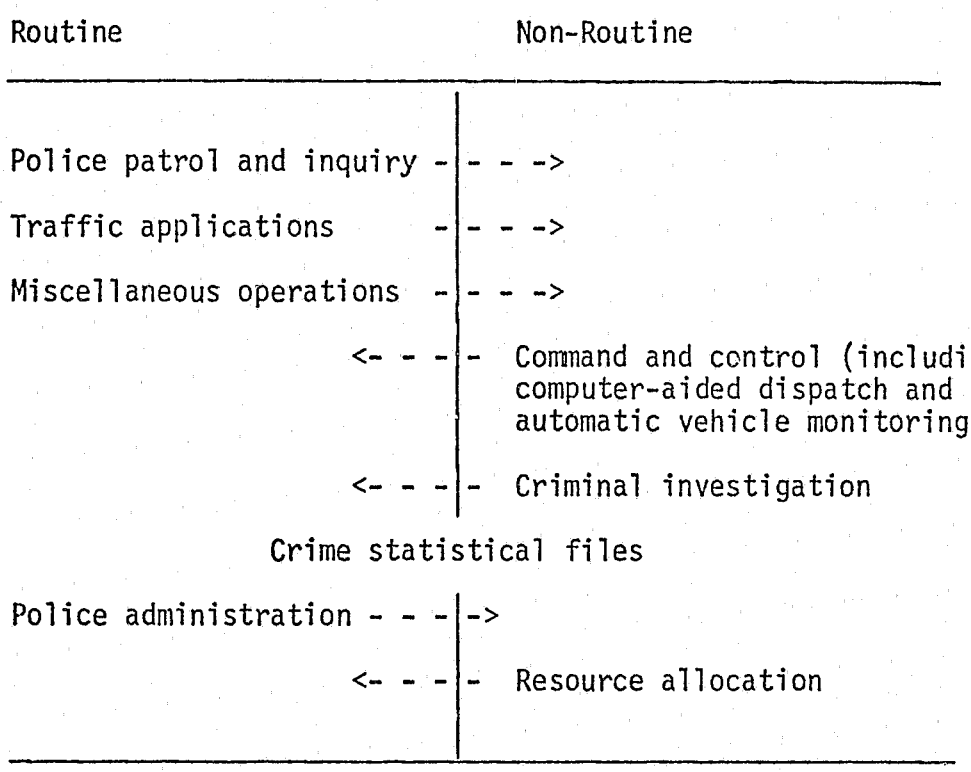
Fig. 1

Computer Use by the Police

Application areas	Computer applications
Police patrol and inquiry	Warrant file Stolen property file Vehicle registration file
Traffic	Traffic accident file Traffic citation file Parking violation file
Police administration	Personnel records Budget analysis and forecasting Inventory control file Vehicle fleet maintenance Payroll preparation
Crime statistical files	Crime offense file Criminal arrest file Juvenile criminal activity file
Miscellaneous operations	Intelligence compilation file Jail arrests
Resource allocation	Police patrol allocation and distribution Police service analysis Traffic patrol allocation and distribution
Criminal investigation	Automated field interrogation reports Modus operandi file Automated fingerprint file
Computer-aided dispatch	Computer-aided dispatching Geographic location file

Fig. 2

Routine and Non-Routine Uses of Police Computer Technology



repetitive manipulation and enquiry of prescribed data, often by means of a definite procedure. The same manipulation was usually done by hand before the advent of the computer. Technology simply makes the process quicker and easier. For example, in police patrol and enquiry you may be talking about a system which is sophisticated from a technical perspective but really you are doing a relatively straightforward manipulation of the data.

When you get to the non-routine area, applications are more elusive. Here the machine becomes a tool to aid in the decision-making and planning process. There are no absolute cut-and-dried methods for handling problems, either because the area is so complex or because it is so important that custom-tailored solutions are required. In the non-routine area examples include modeling, resource allocation, criminal investigation and command and control. On the routine side, you can see (Figure 2) I have listed police patrol and enquiry applications, traffic applications and police administration applications. Obviously when you talk about a spectrum like this, there are really no absolute cut-and-dried breakdowns. Rather you are talking about moving from one end of the spectrum towards the other. As applications move towards the non-routine end of the spectrum, systems design becomes more difficult and behavioral personality and organizational considerations become even more significant. Several application areas obviously fit in between. An illustration of this is crime statistical files (I think we have talked about this already in this conference). The basic collection of that data is a routine and straightforward process. However, when you begin to analyze the information and to use it for your purposes you move towards the non-routine side. Computer-aided dispatch is another application which has both routine and non-routine dimensions.

When talking about the evolution of the use of technology in the United States, I have found it useful to talk about evolution over four time periods - 1960 to 1966, 1966 to 1971, 1971 to 1974 and 1974 to 1977. Let me again give you the very quick version of this. You will have to believe me on a couple of things. In 1966 (Figure 3) major dominance fell in the area of routine applications. You can see routine applications drawn at the top and more non-routine applications drawn towards the bottom of each of the charts (Figures 3-6). Police administration, traffic, crime statistical files, police patrol and enquiry, miscellaneous operations, resource allocations, computer-aided dispatch and criminal investigation are shown. You can see that in 1966 real dominance and, in fact, half of the computer applications fell in the area of police administration and routine traffic kinds of

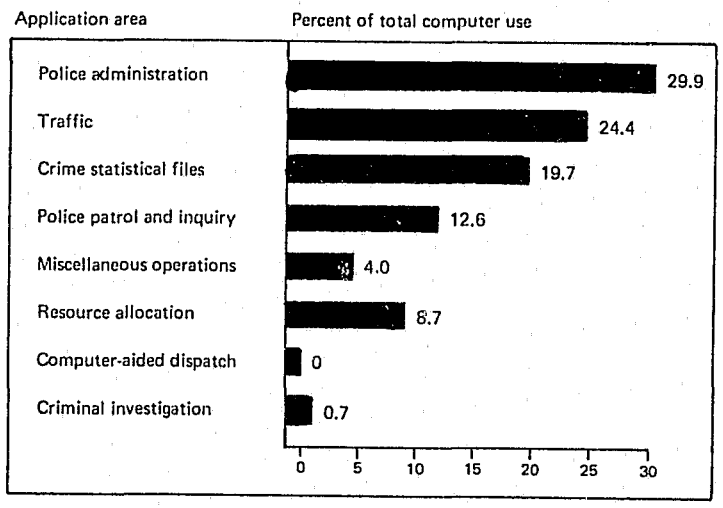


Figure 3 *Status of computer use in 1966*

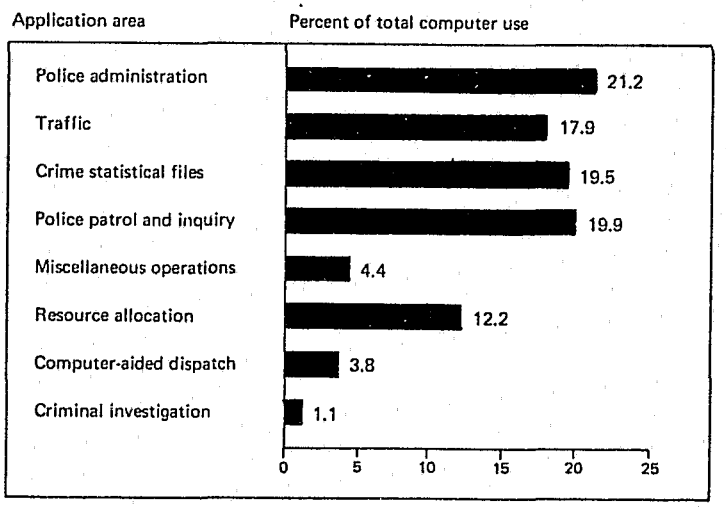


Figure 4 *Status of computer use in 1971*

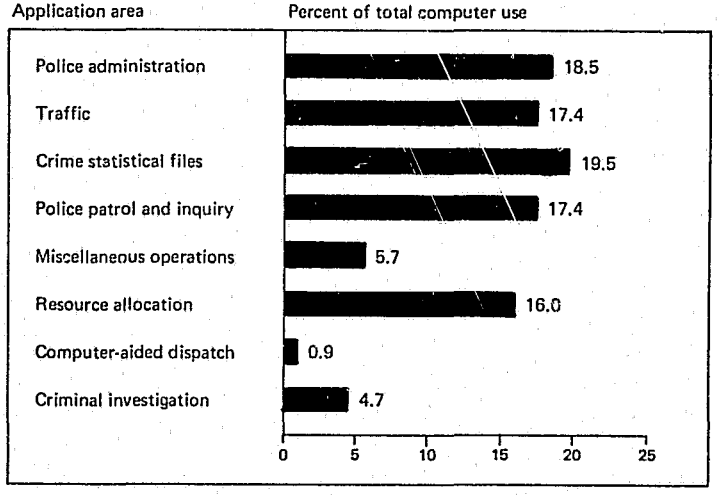


Figure 5 *Actual status of computer use in 1974*

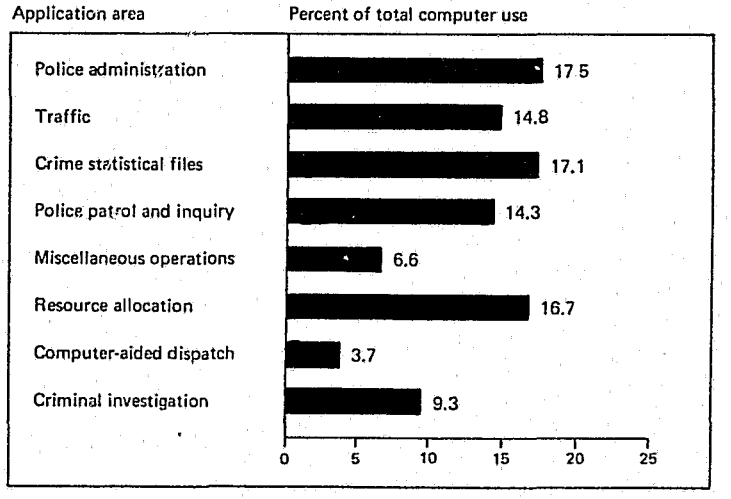


Figure 6 *Status of predicted computer use in 1977*

applications. Between 1966 and 1971 you see an interesting shift within the routine application area. These figures, by the way, represent percentages of total use of computers by the police. You see (Figure 4) continued importance for police administration, traffic, crime and statistical files. You also see a major increase in police patrol and enquiry applications. That is the period in the United States when the ALERT system in Kansas City and the ADAM system in Los Angeles began. Much effort was expended on police patrol and enquiry. Also CI got started in the United States during that time. Also in non-routine computer applications you see an interesting phenomenon begin, namely more and more effort and use by the police in resource allocation.

In 1974 a couple of other interesting things occurred (Figure 5). Much use continued in the structured areas. An interesting phenomenon is revealed by comparing data between 1971 and 1974 in terms of what police predicted and what they actually did. Something began to happen. Predictions in all of the structured areas of police administration, traffic, crime, statistical files, etc. far exceeded what they had actually ended up doing by 1974. Thus you had expectations of going ahead of what they talked about doing but still major emphasis in terms of that area. An interesting thing happened with respect to resource allocation. That was the only area where what actually was done by 1974 exceeded the predictions of 1971. So you see increasing emphasis by law enforcement agencies on resource allocation. In two other non-routine uses of computers, computer-aided dispatch and criminal investigation, the reverse occurred. People predicted extensive use. In 1971, 61 police departments talked about using a computer and having one installed for computer-aided dispatch by 1974. In 1974, the reality was that of those 61, 15 had actually begun to install some sort of a computer-aided dispatch system. So expectations were far in advance of what actually occurred in these non-routine areas.

One other interesting thing with respect to use of computers in resource allocation is that we asked police departments to rank the areas most important to them in the use of computer technology (Figure 7). In 1971 and in 1974 you see that departments say computer technology in resource allocation is the most important application. After a decade and a half, I think there is no doubt that in the United States computer technology will continue to be used in law enforcement. Clearly the use is here to stay and it will be here in the future.

The more critical questions I would like to discuss during the remainder of the time are: "What is the impact?" "Do the

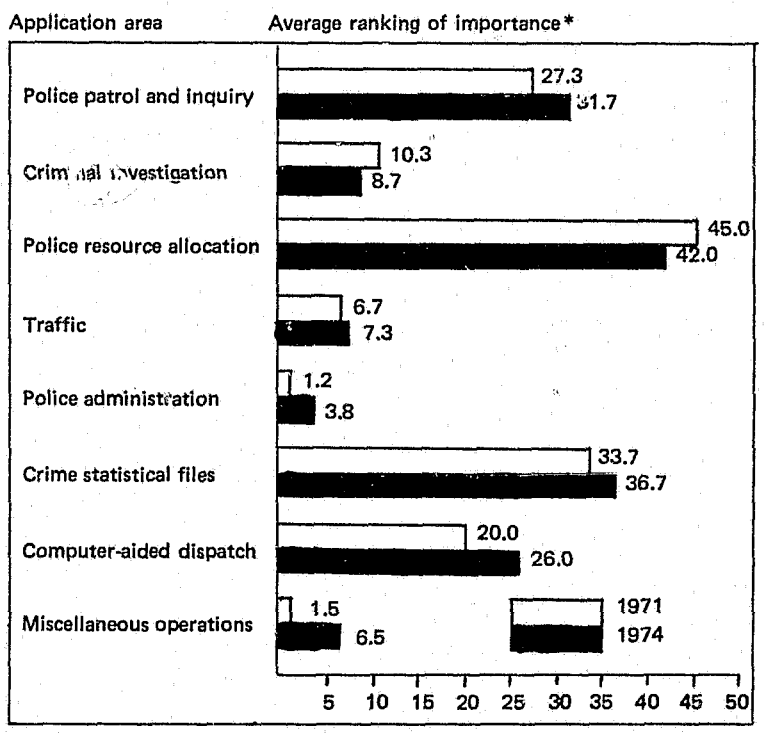


Figure 7 *Importance of computer applications in 1971 and 1974, as ranked by police departments*

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* Ranking is based on the average number of times applications were selected by police departments as one of their three most important applications.

benefits justify the cost?" and "What has happened in terms of implementation?". To do that, I first must define a framework for evaluation. Let me give you a breakdown I have found useful.

FOUR PART FRAMEWORK FOR EVALUATION

1. Does the application "work" -- that is, does it stay in operation for a period of years and does it meet the objectives that were originally specified?

2. What are the technical impacts? e.g. Lower costs of processing data, availability of new or better information, greater speed in processing, wide distribution, etc.

3. What are the service impacts? e.g. changes in police task or the service delivered by the police.

4. What are the power impacts? e.g. changes in the structure of decision making, losses of one person's power as compared to another person, greater to centralization, etc.

This is to talk about evaluation in four different areas. I will go through this quickly and you can ask questions at lunch if you wish. First of all the most basic: Does the application work? Let us go back to the original objectives that people stated when they started to implement the system. Were those objectives fulfilled? Then you begin to get into succeeding levels of more difficult dialogue about impact. First: What are the technical impacts? By this, I mean things to do with the processing and the input and output of information and, for example, lower costs of processing data, availability of new and better data and greater speed at processing the information. Those are the types of things I mean by technical impacts. Then we begin to move to a more difficult level. What is the service impact? What does it mean in terms of the police task and what does it mean in terms of service

delivered to the public? I will give some illustrations of that later. Finally, an even more difficult area but a very important one, has to do with the power shifts. What are the changes in the structure of the decision-making process - centralization versus decentralization. And beyond that, who gains and who loses, in terms of the power? For example, there are questions having to do with privacy which fit under privacy impacts. Does the individual citizen lose in terms of access and control over information, say as compared to bureaucracy?

Let us talk about the use and impact in the various areas I have talked about. First may I very rapidly go through applications in the routine areas. This is why the distinction turned out to be helpful for me. I found that, with respect to criterion number one throughout the United States, although the success varied greatly from department to department it was very easy to point to a number of computer areas where the application had been in use over a number of years. In fact when you talked about the original objectives - information to the man in the street in seven seconds - that objective had indeed been met. With regard to technical impacts, again you found that technical impacts existed in the routine uses of computers. You really did have extensive additional availability of new information, rapidly processed and widely distributed. Of course the important question there is what do you do with this data sitting around on tables and shelves and so forth. What difference does it make? What influence does it have on service impacts? There the situation is more difficult to describe even in routine applications. If I talk about service impacts in a very narrow way, then I can identify a number of cases where the routine uses of computers are cost effective systems.

Let me give you a couple of very quick illustrations from the book that I am doing. Obviously in the book I go into this in much greater detail. But, for example, in Tulsa, Oklahoma, they set up a traffic citation collection system and in the first year they brought in $180,000 of profit above the system cost in revenues collected. They had a more efficient routine system to follow up on traffic violations. In Long Beach, California, membership in an automated want/warrant system brought an increase in the number of warrant arrests of 31 per cent in the first year that it was installed over the warrant arrests of the year before. These are the kinds of results you can describe as long as you restrict yourself to narrow definitions of success.

However, when you consider some of the broader service impacts, it gets more complicated. You have, for example, the Chief of Police in Kansas City saying that "We have a great system - the

ALERT system - which gives information to the man in the street about stolen cars, wanted persons, and so on. It works just great. The problem I am having is that the men are using it too much and, in fact, now I have them spending all of their time running car checks on the cute girl in front of them driving down the street, or on stolen cars when in fact I would like them to spend time on other aspects of police service". So you have unintended service shifts taking place through the use of routine applications.

Secondly, and I think this is probably much more important in the United States than here, we have had resources from the Law Enforcement Assistance Administration. This money can be a "seductive stimulant" and I can point to a number of cases where technology has been implemented where probably it should not have been. Because it was there, they wanted to use it. And in fact the use has not been well received. Again, I have found it is extremely difficult to measure with confidence the service impacts of technological innovations on crime. Crime statistics are a function of a whole range of things, from the time of day to the season of the year, the weather, neighbourhood reporting patterns, reporting requirements within individual police departments, etc. I would argue that to try to relate the use of technological innovations to changes in crime patterns requires a leap of faith which is far too great. In fact we are probably hunting the wrong set of measures when we say we deployed this new resource allocation system and the crime rate changed by x, y or z. Because I can show you that you change ten other things at the same time and those ten other things might have contributed to the shifts that you saw in crime rates. So again you get into real difficulties in measuring the service impacts, both in routine and non-routine applications. Finally you get questions about the power impacts, privacy issues come up and need to be dealt with (as we have heard and talked about this morning) and you have questions of shifts of control. Do people who understand quantitative data, like all of you folks, gain in power in a police department because of the use of this technology? Probably so, but the data still isn't completely clear. In summary, though, I would say routine applications have been successful. Some questions still exist with respect to three and four, but again relatively straightforward things are beginning to happen.

When you get into the non-routine area, questions are much greater. We have already heard about that and Gordon Cassidy talked about the whole area of resource allocation. Let me just make a few comments with respect to some of my findings on resource allocation applications in police departments in the United States. I found that a fascinating dichotomy existed there. On the one hand, as I indicated

earlier, police departments say that this is the most important area for computer use. On the other hand, you begin to realize that they are really talking about a set of crime statistics available to make ballpark guesstimates as to how allocation ought to go, and that out of all the people talking about resource allocation applications, only about 18 per cent are beginning to use any sort of mathematical modeling. So you really have to understand what you are looking at.

Then, when you begin to look at the actual implementation, you discover that the state of the literature often exceeds the state of the art. You read that you have this fantastic system and then you discover that it was in operation for about six months but nobody has used it for long. We did three case studies of resource allocation applications in St. Louis, Missouri, in Los Angeles, and in Boston. In all of those, problems had existed with respect to implementation and in only one, Los Angeles, did the system meet the first criterion of actually being operational over a period of time. We discovered that the modeling efforts and the queuing theory that they were using at the outset had been abandoned and that they had converted to a management information system. It had the same name but it was really a management information system with a different set of objectives from the ones they had when they started out. So you have to realize that expectations may not always be met in these applications. On the other hand I would argue that the three case studies obviously do not represent the cutting edge of the state of the art.

Some of you might be familiar with several other models which are now receiving fairly extensive use in the United States. These include the Patrol Car Allocation Model (PCAM) which was developed by Jan Chaiken at the Rand Corporation. Also, a colleague of mine at MIT, Dick Larson, has done a lot of modeling work on the hypercube model which is receiving publicity. I guess there are perhaps 30 police departments around the United States that are trying to implement one of the two models but the success and level of implementation are still not known. I would argue that the general application of models is found in other areas. For example, the Rand Corporation did a study on the use of models in the criminal justice area and concluded that, in general, models have failed to achieve the level of use for policy decisions that was intended. Well, does that mean that, frustrated, we ought to abandon any efforts? I would argue not. I can't go into detail on all of the conclusions that you can read about in my report to the LEAA, which will be published in book form, but let me give you a few highlights.

CONCLUSIONS CONCERNING THE USE OF COMPUTER TECHNOLOGY TO AID IN THE RESOURCE ALLOCATION OF POLICE SERVICES.

1) Experimentation will continue to grow, but success will continue to be limited and some of the earlier expectations in this area will not be met.

2) Modeling efforts help us to learn more about the criminal justice system, but the education process must be two way.

3) There is a strong need for careful evaluation and special attention to the process of implementation.

4) There is no one best way to allocate law enforcement resources.

Experimentation on resource allocation will continue to grow but success will continue to be limited and some of the earlier expectations will not be met. You know back in the 1960's they were talking about fluid patrols. A police officer comes on duty and he doesn't have a standard beat but will get his allocation on a daily basis based on predictions of what is going to happen to the crime patterns that day. Hey folks, that is not going to happen for at least ten, 15, 20 - probably 50 years! There are some basic things about the way that the police operate and you are always going to have to interact your modeling effort with the basic nature of the police departments. The fact is that the men do not want to change beats every day and there is a whole different psychological effort. I can tell some interesting war stories on that. Modeling efforts, though, do help, as we heard in the last session. I can understand about the criminal justice system and the way it works. However, I would argue very strongly that the education process has to work both ways. It can't just be the model builders getting educated; it also has to be the users of the models helping to educate the model builders. That two-way process is extremely difficult to bring about. There is a strong need for continued and careful evaluation and special attention to the process of implementation.

Finally, you really have to realize that there is no one best way to allocate police resources. One of the fascinating things we found, in the Los Angeles case, was that the police department began to implement a modeling system which basically aimed to allocate resources to respond to calls for services 95 per cent of the time without a delay. Basic criterion of that model-response to calls for service. At the same time they began to implement a team policing strategy starting with the basic car plan and then a team policing program where the emphasis was on putting a set of officers in a particular area of the city and keeping them there. Those two strategies conflict, folks. You have to understand that there are alternative ways that one can allocate resources and one of the reasons that the modeling effort got pushed aside is priorities. I think that this is fine, and that police departments ought to be able to do this. It was much more concerned with the team policing approach than with rapid response to calls for service.

But you have to realize, when you are talking about models, that these implementation considerations are important and there are implications that follow. So you can't just take a package from Joe Vendor that is going to solve the problems of the world. There will be some implicit assumptions in that model and the users have to understand those assumptions. That is why the process of model building has to be a two-way street.

Well, I think that my time has almost run out. We did work on CAD and command and control systems. Let me mention a couple of things and then the paper can go into some of this in greater detail. We found that there certainly are operational CAD systems in the United States that are working pretty well with regard to technical and some service impacts. On the other hand, there are some questions about how the information is to be used. The real success probably has to wait until we discover the ability of police managers to take advantage of all this information. It is my feeling that police chiefs have not always viewed themselves as managers of a set of police resources. Rather their job is one of public relations, to make sure that things are moving smoothly, and to get greater resources. They want to get more dollars for the department. But managing those resources is a style you do not find very often, at least among the police chiefs I have come in contact with. So the behavioural side is very important. We have done a detailed study (we being a couple of colleagues of mine) on the use of automatic vehicle monitoring (AVM) systems in St. Louis, Missouri, which is available in the literature. If any of you are interested I would be glad to take your name and send you a copy. That calls into question whether AVM is going to have any impact on response time and that is often one of the main reasons we want to set up this new automatic vehicle monitoring (or automatic vehicle locator system).

This just raises a lot of questions about whether or not that's really going to be the case.

Perhaps I can just show you a chart showing in outline some of the things which seem to be essential for successful implementation.

FOUR BROAD AREAS WHICH ARE NECESSARY TO SECURE THE SUCCESSFUL IMPLEMENTATION OF COMPUTERS

Improve the quality of the computer technology.

Establish better quality controls between vendors and users. e.g. establish standards in "truth in technology".

Greater interaction between builders of technology and the users.

Greater integrity of personal behavior among individuals involved in the process of implementing innovations.

These are dealt with in detail in my book.

DISCUSSION

J. G. ARNOLD: I have two questions. With regard to the interaction in the model and the modeler himself, who should be inputting into the model? The man in the street, the police administrator, how low should we go?

K. W. COLTON: Well, if you were to talk about the ideal world, you might want to go all the way and involve everybody. I think you have to be realistic. First, I think you have to start with the first level, those people who are going to be making the decisions with respect to the allocation of resources. It turns out that in police departments that sort of decision very seldom involves the man in the street. It's a decision made by the head of the bureau - field operations or whatever they call it. But I think you do have to involve the chief of police if he's interested, and there has to be an interaction there if he is going to be

the user of that system. Certainly you have to go beyond that and you have to talk to the head of field operations or district commanders - the people who are actually going to use the system. For example, in St. Louis they were one of the first areas to use police modeling, and they tried to use exponential smoothing techniques to do some prediction of the crime rate. They would come up with a kind of ideal allocation of resources. The police commanders, however, were never involved in the process. It turned out they were the people who had to use the model; they had to understand it, and they had the final decisions on the actual allocation of resources. They decided whether they would ignore the recommendations from the model or implement them. They ended up being very uninterested and, when I went there at the end of 1969, when the system was still around, you would talk to people at central headquarters who would say "Yes, we have this great modeling technique". Then you would go out and talk to district captains and they would say "Oh yes, resource allocation. We gave that up last year, didn't we". You found a real disparity, so I think you probably have to go down to the level where the decisions are made, and that turns out to be at least at the district command level. Beyond that, I think you're being very unrealistic.

J. G. ARNOLD: Have you run into problems with police unions?

K. W. COLTON: Well sure, and that's where you get into the other side of the interaction and again, that's an interesting story from St. Louis. They don't have a police union but they have an important patrol officers' association (and there is a distinction, by the way). They decided that, in terms of the deployment patterns, it made a great deal of sense to shift the duties. They have their shifts going from 7 to 4, 4 to 11 and 11 to 7 - their basic three shifts around the clock. They decided that it made good sense to wait for an hour at 11 o'clock at night - one of the peaks - and to change the shifts to 8 to 5, 5 to 12 and 12 to 8. They implemented that and found major opposition from the police department and from the officers. The reason was that it put the police officers commuting right with all the other commuter traffic. Before, they had gotten off just before five o'clock and could get home and avoid the rush hour. The resistance was so great that within a period of six months they had to go back to their original shifts. So you have to understand that we can utilize scientific rationality so far but we do have to interact with the officers. Now they might have avoided some of those problems if, when they got to the implementation stage, they had used a much more extensive kind of education and communication.

Often you discover that implementors of innovations make some interesting assumptions about their technology. If the technology exists, there must be a need and implementation should proceed. That may not be the case.

COMMON IMPLEMENTATION ASSUMPTIONS

If the technology exists, there must be a need and implementation should proceed.

If only the technical problems can be resolved implementation can move forward.

Time constraints mean that implementation must rely on a small group of supporters.

Law enforcement supervisors really don't need to understand how innovations work, they simply need to know how to use them.

The sooner, the better.

If the new technology is installed, positive results will occur.

If only the technical problems can be resolved, implementation must rely on a small group of supporters. We don't have the time to involve all the people. It's too complicated to do that.

Law enforcement supervisors really don't need to understand how innovations work - they simply need to know how to use them. I don't go along with that. I think that they need to get into it in much greater detail.

The sooner the better - oftentimes not the case.

Or, if the new technology is installed, positive results will occur. Well, not always the case. So you have to talk about that in much greater detail. It turns out that you can turn these assumptions around and develop a checklist of things that are interesting to talk about.

S. W. WITIUK: Did you find many situations where you did these things, or tried to do them, and the first reaction was "I don't want to get involved in it. I don't understand it. Let one of my people do it". And yet, usually the group on which you want to minimize the impact of shifts of power was hesitant to get involved in a serious way?

K. W. COLTON: You have this dilemma and that's why at the outset I said it's important for us to realize that we don't know the answers to everything and we are indeed probing. In fact you think you know that this is the way you ought to proceed, but the resistance is there. You might even have to come to grips with it, if you are the innovator of technology. But there must be other more productive ground on which to cast the seed. So there really may be places where you decide that the innovation that makes sense in a particular police department is not very sophisticated technologically, but it's a question of doing some quick and dirty analysis based on available statistics. Let's not worry about a model with lots of bells and whistles on it. Let's just try to go the next step. And that's why you have to fit the effort and the content of the particular environment you're in and that makes a great deal of difference.

S. W. WITIUK: That applies right down to the individual level, as far as I'm concerned. What will work for three managements will never work for the fourth.

K. W. COLTON: That's right. And there isn't a consistent kind of answer. So you really can't answer the question "Do the benefits justify the cost?" because that's going to vary from department to department, depending on how the implementation occurs.

J. G. ARNOLD: Where do your innovations and models come from - universities, Rand Corporation, the commercial sector, or elsewhere?

K. W. COLTON: They have come from a range of places. I alluded to them at the outset but I can go into them in more detail. The President's Commission on Law Enforcement and the Administration of Justice recommended a number of technological innovations. Those bacically came from the academic community interacting with law enforcement personnel at a national level - a kind of brainstorming effort. I think that carried the thrust for four or five years. Clearly, the vendors are very important in the United States for innovation. They are the technology change agents. We could talk about that at some length if we wanted to. They go from department to department selling, for example, their CAD system. Often they have a vested interest, obviously, in selling their product, so they tend to present

information in a certain light. One of the things I think would be fascinating in the United States, and I'm sure also in Canada, is this. You begin to now have a series of kind of experts in police departments who understand both the technology and the police. I think that's a resource you can draw upon more, to help be a technology change agent. Then there really is an effort within the department to do a better job, so I think one can be too cynical about the reasons. I think people really do want to improve police services and part of it really does spring from within the department. The attitude towards innovation varies significantly in the United States from department to department. In certain departments they're very innovative and they are the ones that have had the ideas.

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