



DECISION SUPPORT SYSTEM (DSS)

CODE: IS341

Prerequisites:-

Foundation of information system

(IS101)

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DSS SYLLABUS CONTENTS

- Basic concepts of DSS
- DSS architectures:-
 - A. Different components.
 - B. Characteristics.
 - C. Structures.
 - D. Uses of DSS in different fields.
- DSS models institutional and ad hoc.
- DSS operating and evolving.
- Application of DSS in different disciplines.
- Hardware and software selections of DSS.

ATTENDANCE

Chapter(1)

Introduction to decision support system



- Everyone makes hundreds of decisions each day

A. Inconsequential

(what to eat for breakfast?)



B. Significant

(How best to get the economy out of a recession?)



(Good outcomes from Any decision is better than bad outcomes)

- All of us would like to have a tasty nutritional breakfast (especially if it is fast and easy)



- the country would like to have a stable, well-functioning economy again.

Some individuals are "lucky" in their decision processes.

- ✓ the decision **not** really looking at **all of the options** or at **useful data** and still experience good consequences.



- ✓ We have all met people who instinctively put together foods to make good meals.

- ✓ We have seen companies that seem to do things **wrong** but still make **a good profit**.



✓ **Good** outcomes in decision making are a result of making **good** decisions.

"Good decision making"

- means we are informed and have relevant and appropriate information on which to base our choices among alternatives.
- In some cases, we support decisions using existing, historical data.
- Other times we collect the information, especially for a particular choice process.

- ❑ The **information** comes in the form of facts, numbers, impressions, graphics, pictures, and sounds.
- ❑ It needs to be collected from various sources, joined together and organized.
- ❑ The process of organizing and examining the information about the various options is the process of **modeling**.
- ❑ The **Models** are created to help decision makers understand the ramifications of selecting an option.
- ❑ The **models** range from quite informal representations to complex mathematical relationships.

When deciding on what to eat for a meal?

The First Model **(simple) :**

□ Historical data:-

(such as)

- A. Those available from tasting.
- B. Eating the various meal options over time.
- C. Our degree of enjoyment of those options.
- D. Cost.

The Second Model **(complex) :**

“Diet Problem” to find the cheapest combination of foods that will satisfy all the daily nutritional requirements of a person.

- A. Use linear programming.
- B. 9 equations.
- C. 77 variables.
- D. 9 clerks.
- E. hand-operated calculators.
- F. 120 days to find the optimal solution.





Assignment

What about business world!!!

- ✓ Use models → to help refine understanding of:
 1. What ?
 2. How ?

Customers purchase from the business owners to improve customer relationship management.

In business cases

- ✓ We collect information
- ✓ From → *Point-of-sale systems.*
- ✓ For → *All of our customers.*
- ✓ Duration → *Multiple years.*
- ✓ Used Tool → *Data-mining tools.*
- ✓ Why → *To determine profiles of our customers.*
- ✓ Those profiles enables decision makers and managers to change marketing campaigns and target some marketing campaigns.

The decision quality based on

1. the adequacy of the available information.
2. The quality of the information.
3. The number of options.
4. The appropriateness of the modeling effort available at the time of the decision.



More information (or even more analysis) is better.

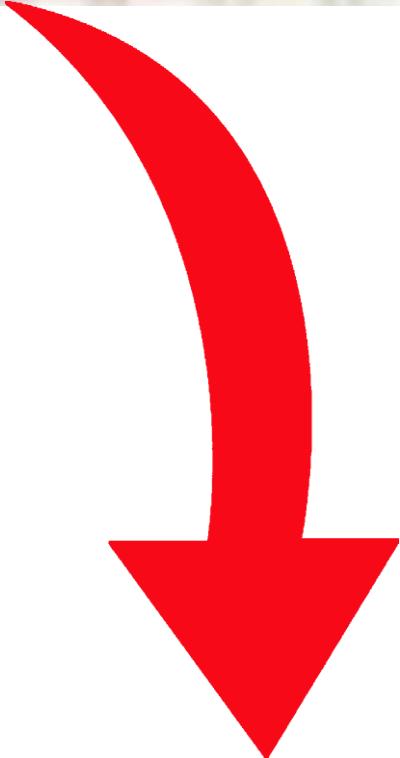


More of the appropriate type of information (and analysis) is better.

In fact, one might say that to improve the choice process, we need to improve the information collection and analysis processes.



- Corporations are attempting to make more informed decisions to improve their bottom lines.
- Some refer to these efforts:-
 - A. to use better information and better models to improve decision making as **business intelligence**.
 - B. As analytics.



- To provide the best guidance for the decision maker.
- To understand what is going on in the business.
- To consider problems from multiple perspectives.

Is to bring together the **right information** and the **right models**.

How!!!

DSS Decision Support Systems

DSS:-

Is a computer-based systems that bring together information from a variety of sources, assist in the organization and analysis of information, and facilitate the evaluation of assumptions underlying the use of specific models.



- The DSS allows decision makers to access relevant data across the organization as they need it to make choices among alternatives.
- The DSS allow decision makers to analyze data generated from **transaction processing systems** and other internal information sources easily.
- The DSS allow access to information external from the organization.
- Finally, DSS give the decision makers the ability to analyze the information in a manner that will be helpful in particular decision and will provide that support interactively.

SO

the availability of DSS provides:

- A. the opportunity to improve the data collection and analyses processes associated with decision making.
- B. The opportunity to improve the quality and responsiveness of decision making and hence the opportunity to improve the management of companies.
- C. The DSS provides decision makers the ability to explore business intelligence in an effective and timely fashion.

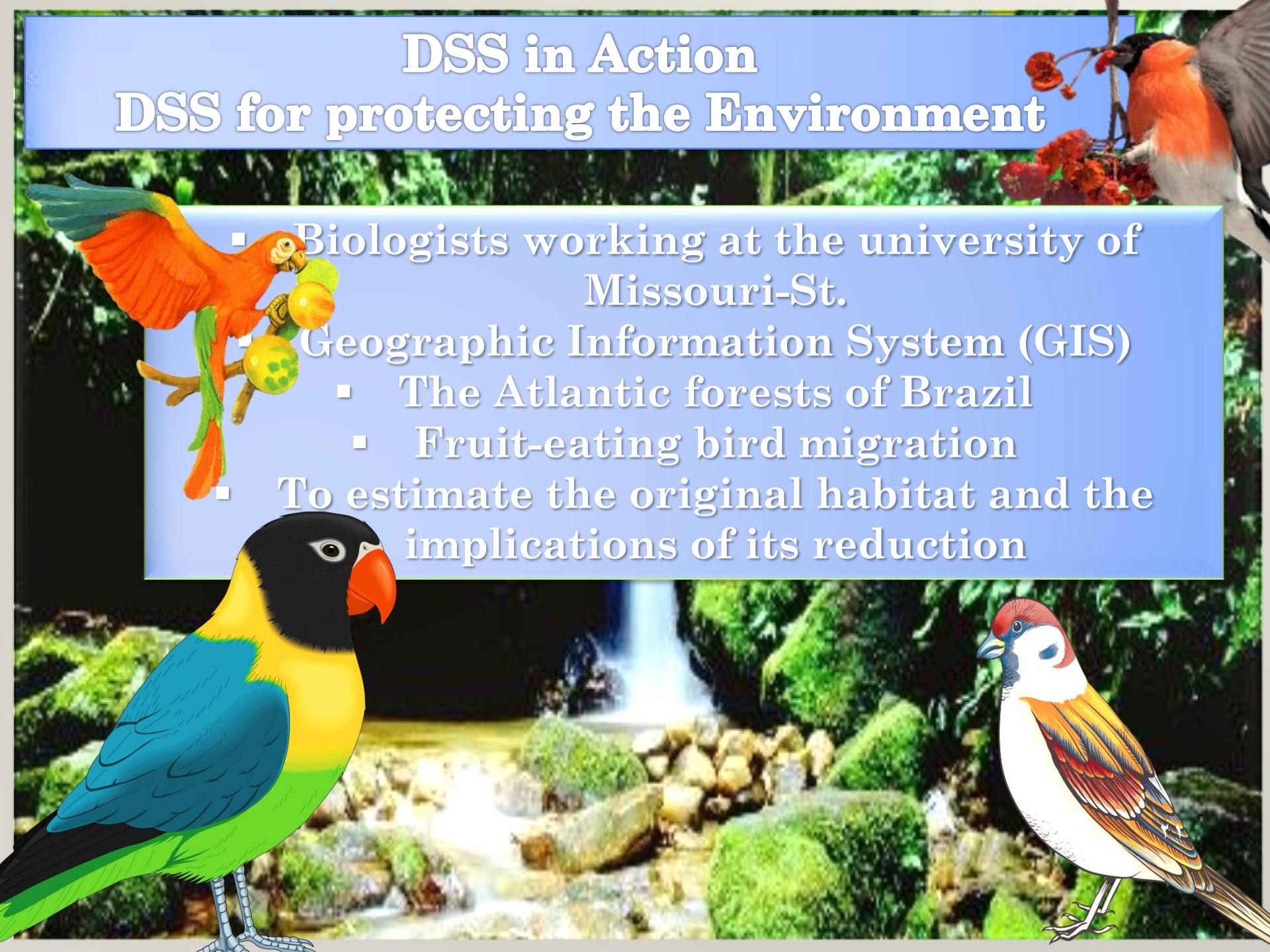
To see how DSS can
Change the way in
which decisions are
made

Let Us See!!!

DSS in Action

DSS for protecting the Environment

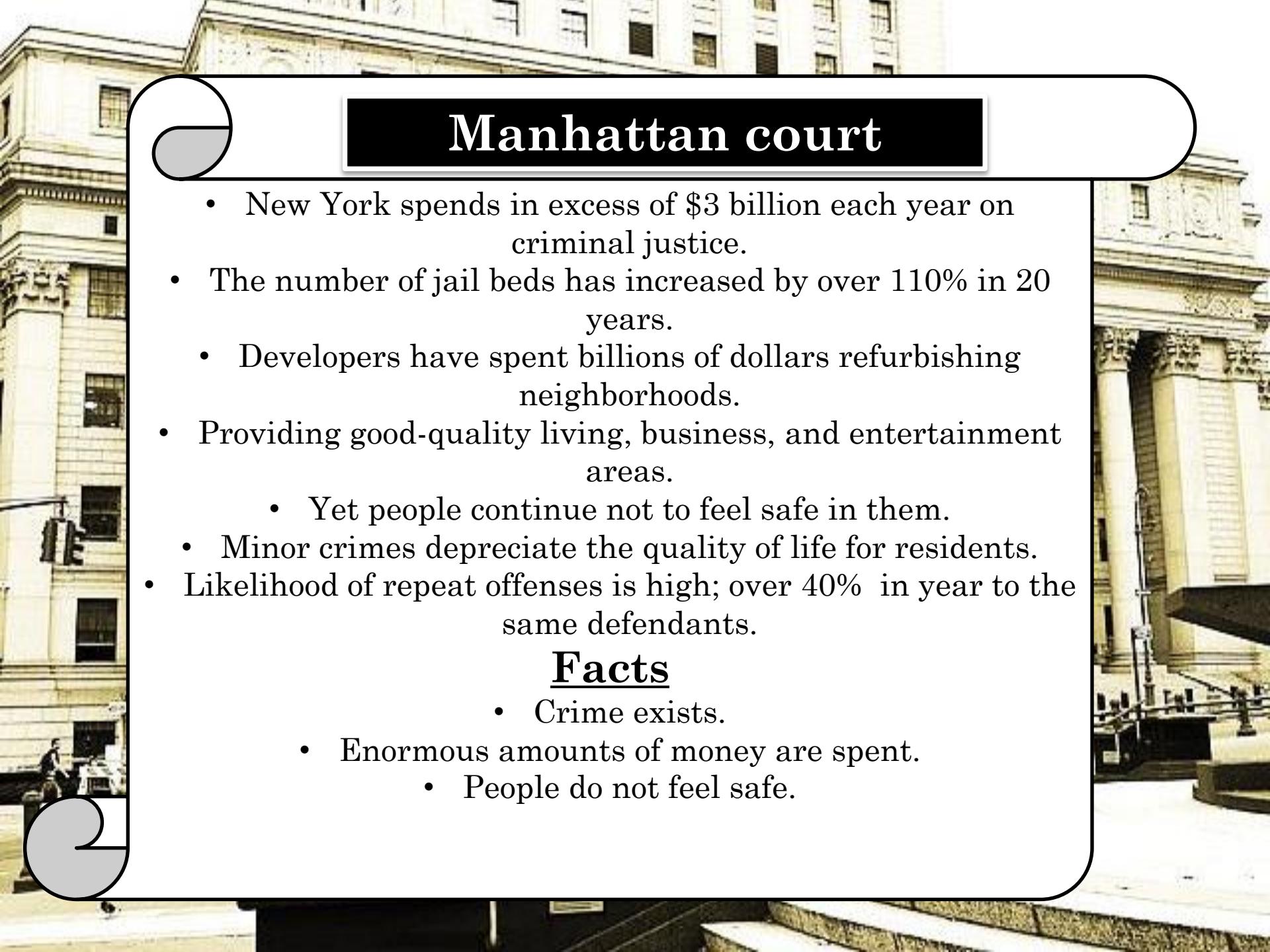
- Biologists working at the university of Missouri-St.
- Geographic Information System (GIS)
 - The Atlantic forests of Brazil
 - Fruit-eating bird migration
- To estimate the original habitat and the implications of its reduction



- They modeled the historic distributions of birds in this region using a GIS.
- Digitized environmental layers from the National Atlas of Brazil.
- These historic distributions were compared to the present forest coverage to estimate the impact of the vast deforestation of this area.

- allowed the researchers to consider a wide range of options that impacted biodiversity conservation decisions of these forests.





Manhattan court

- New York spends in excess of \$3 billion each year on criminal justice.
- The number of jail beds has increased by over 110% in 20 years.
- Developers have spent billions of dollars refurbishing neighborhoods.
- Providing good-quality living, business, and entertainment areas.
 - Yet people continue not to feel safe in them.
 - Minor crimes depreciate the quality of life for residents.
- Likelihood of repeat offenses is high; over 40% in year to the same defendants.

Facts

- Crime exists.
- Enormous amounts of money are spent.
 - People do not feel safe.

- Manhattan court cont.

However, three facts do suggest the quality of the decision could be improved:

- Criminal justice workers know very little about the hundreds of thousands of people who go through the New York court systems.
- There has been little creative thinking about the sanctions judges can use over time.
- Most defendants get the same punishment in the same fashion.

- Manhattan court cont.

Suggestions for better decisions

- More information.
- More modeling capabilities.
- Better alternative generation tools.

In this case, citizens, court officials, and criminal justice researchers noted the problem of information availability and have developed a process to address it for "quality-of-life" crimes, such as shoplifting and street hustling.

Created a new court

located the **judge** in the same building as **city health workers, drug counselors, teachers, and nontraditional community service outlets.**

- To increase the likelihood of the court working with these providers to address the crime problem innovatively.
- The centerpiece of this effort is a **DSS** that provides judges with more and better **information.**
- *As well as* a better way for processing that information so as to make an impact on the crime in Manhattan.

The previous example illustrates some of the important characteristics of a DSS:-

A. It must access data from a variety of sources.

(In court Example):-

- 1) System accesses the arresting officer's report. including the complaint against the offender and the court date.
- 2) Access to the defendant's criminal record through connections with the New York Division of Criminal Justice.
- 3) These police records are supplemented with information gained by an independent interviewer either at the police precinct or at the courthouse.
- 4) These interviewers query the defendant regarding their lifestyle, such as access to housing, employment status, health conditions, and drug dependencies.

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 - 5) Finally, an intermediary between the court and the services available, called a court resource coordinator, scans the person's history, makes suggestions for treatment, and enters the information into the system.
- B. DSS facilitates the development and evaluation of a model of the choice process.
- 1) DSS must allow users to transform the enormous amount of "data" into "information" which helps them make a good decision.

B. DSS must provide a good user interface through which users can easily navigate and interact.

FIGURE 1.1: MANHATTAN COURT DSS

FIGURE 1.2A: COURT DSS – DRILL DOWN

SCREENS

Community Court Assessment Evaluation Summary									
Charges	PL155.25	DAT Case	Age 29 Sex M Lang. ENGLISH Score						
Prior Record									
Open Warrants:	Y	Date Last Conviction:	05/29/80						
Open Cases:	Y	No of Priors(M/F):	2+/2+						
Probation:	N	Victim Information:							
Parole:	N								
Substance Abuse									
Requests Treatment	Y	Employment/Support History							
Any Prior/Current Treatment	Y	Current Employment (Verified)	N						
Any Prior Use	Y	Number of Dependents	Y						
		Skills	Y						
		Wants Help	Y						
Housing									
Residence (Verified)	N	Health							
Can Return Home	Y	Reported Problems, Symptoms	N						
Homeless	N								
Been Homeless	N								
Compliance History									
Prior Warrants		Prior Alt Sanction							
		Complete Prior Alt							
Disposition Agreement Status									
No Agreement									
Resource Coordinator Comments (Click On The Text To Get More)									
Drug Assessment completed. Recommend placement into detox. and possible 28 day rehab. Review and sentence date									
Attorney	Kenneth Olsen, Defense		Person Expected						
Arrest	Alt. Sanc.	Disp. Info.	ROR	Prior Ct	Notes	Rap Sheet	Documents	Complaint	Close

FIGURE 1.2B: COURT DSS – DRILL DOWN

SCREENS

Prior Community Court					
Appearance History			Status	Community Service	Social Service
Case # 1					
Docket 94C0118	Arrest Date 09/13/94		Completed	Completed 4 Days	Completed 1 Days
	Charge PL 23000				
09/13/94	PGSI CD 1 Y CS 4 D LS EG 1 D PR				
Case # 2					
Docket 94C0123	Arrest Date 09/21/94		Completed	Completed 6 Days	Completed 1 Days
	Charge PL 23000				
09/22/94	PGSI CD 1 Y CS 6 D LS EG 1 D PR				

 Print  Close

FIGURE 1.2C: COURT DSS – DRILL DOWN SCREENS

Recomendation Basis

Age	36	Charge	PL165.40(00)	Interview Completed ?	Y
NYSID	4751092Z	Bench Warrant	N		

Addition Defendant Information

1. Does the defendant have a working phone in his or her residence ? [Blank]

2. Has the defendant lived at his or her current address for 1.5 years or more ? No

3. Does the defendant expect someone at arraignment ? [Blank]

4. Does the defendant live with parent, spouse, common law spouse of 6 months, or legal guardian ? Yes

5. Is the defendant employed, or in school, or in a training program, full time ? No

6A. Does the defendant report a NYC area address ? Yes

6B. Is defendant's address verified, or unresolved conflict ? No

6C. Does the defendant have a verified response to AT LEAST one of the following: #2, #4, #5 ? No

6D. Are the responses to 6A, 6B, 6C all yes ? No

Score: 3A **No Recom. Due: Insufficient Community Ties**

 **Recalculate Score**

 **Modify ROR Information**

 **Exit**

FIGURE 1.2D: COURT DSS – DRILL DOWN SCREENS

Defendant Location Calendar

M94026!

Date	Detox	MCC	Treat	Excuse	Delinq	Verified
03/22/94	○	●	○	○	○	✓
03/23/94	○	○	●	○	○	✓
03/24/94	▲	○	●	○	○	✓
03/25/94	○	○	○	○	●	✓
03/26/94	▲	○	●	○	○	✓
03/27/94	▲	○	●	○	○	✓
03/28/94	▲	○	●	○	○	✓
03/29/94	▲	○	●	○	○	✓
03/30/94	○	○	○	○	●	✓
03/31/94	○	○	○	○	●	✓
04/01/94	○	○	●	○	○	✓
04/02/94	○	○	●	○	○	✓
04/03/94	○	○	●	○	○	✓
04/04/94	○	○	●	○	○	✓
04/05/94	○	○	●	○	○	✓
04/06/94	○	○	●	○	○	✓
04/07/94	○	○	●	○	○	✓
04/08/94	○	○	●	○	○	✓
04/11/94	○	○	●	○	○	✓
04/12/94	○	○	●	○	○	✓
04/13/94	○	○	●	○	○	
04/14/94	○	○	●	○	○	
04/15/94	○	○	●	○	○	✓
04/18/94	○	○	●	○	○	

Program Name

Notes
Def attended TRP today. Def tested pos for cocaine.

Drug Test Results

Cocaine	Positive
Morphine	Negative

Click Row To View Program and Notes

Print Last 20 Entries

 Print

 Mail

 Close

FIGURE 1.3: COURT DSS – FLEXIBILITY IN DATA ANALYSIS

Alternative Sanctions Compliance

List of Non-Attendance

Name	Date of First Non-Appearance	Docket #	Date Rem. Letter Printed	Date Notice Printed	Warrant Date	Disposition
FLOYD	5/1/96	96C005	5/16/96	5/17/96	6/20/96	WO APAR6
LOONE	5/1/96	96C005	5/16/96	5/17/96	5/22/96	RSNT IMP 20D APAR6
GHTBOU	5/1/96	96C005	5/16/96	5/17/96	7/20/96	RSNT IMP TS APAR4
MIDDLET	5/2/96	96C005	5/16/96	5/17/96	7/2/96	WO APAR6
ACK	5/2/96	96C005	5/16/96	5/17/96	7/3/96	WO APAR6
RAITWHI	5/2/96	96C005	5/16/96	5/17/96	7/23/96	RSNT IMP 40D APAR3A
ORAN	5/2/96	96C005	5/16/96	5/17/96	7/3/96	WO APAR6
DRRES	5/2/96	96C005	5/16/96	5/17/96	7/8/96	WO APAR6
GGINS	5/2/96	96C005	5/16/96	5/17/96	6/20/96	WO APAR6
RACHE	5/2/96	96C005	5/16/96	5/17/96	7/1/96	SCONT APAR3

From: 05/05/96 To: 05/07/96

Print Preview

Manual Print Mode
 Batch Print Mode

Reminder Letter not sent
 Violation Notice not sent
 Warrant not ordered
 Entire List

Build List **Print** **Details** **Reminder Letter** **Violation Notice** **Close**

Grocery Store

- Today's analytics provide more than just the profit level or sales quantity of a store.
- With new data mining tools managers can now get insights into:-
 1. *Why* sales hit specific levels?
 2. *What* is likely to happen next month?
- By analyzing huge quantities of data, managers better understand what drives different categories of shoppers..
- This, in turn, stimulates decisions such as how to rearrange store layouts, stock shelves and price items.
- Once shopping behaviors and preferences are understood:-
 1. Store then can tailor offerings accordingly to differentiate themselves from competitors.

Grocery Store

Britain's Tesco relies on mined data for decisions, including the development of house brands.



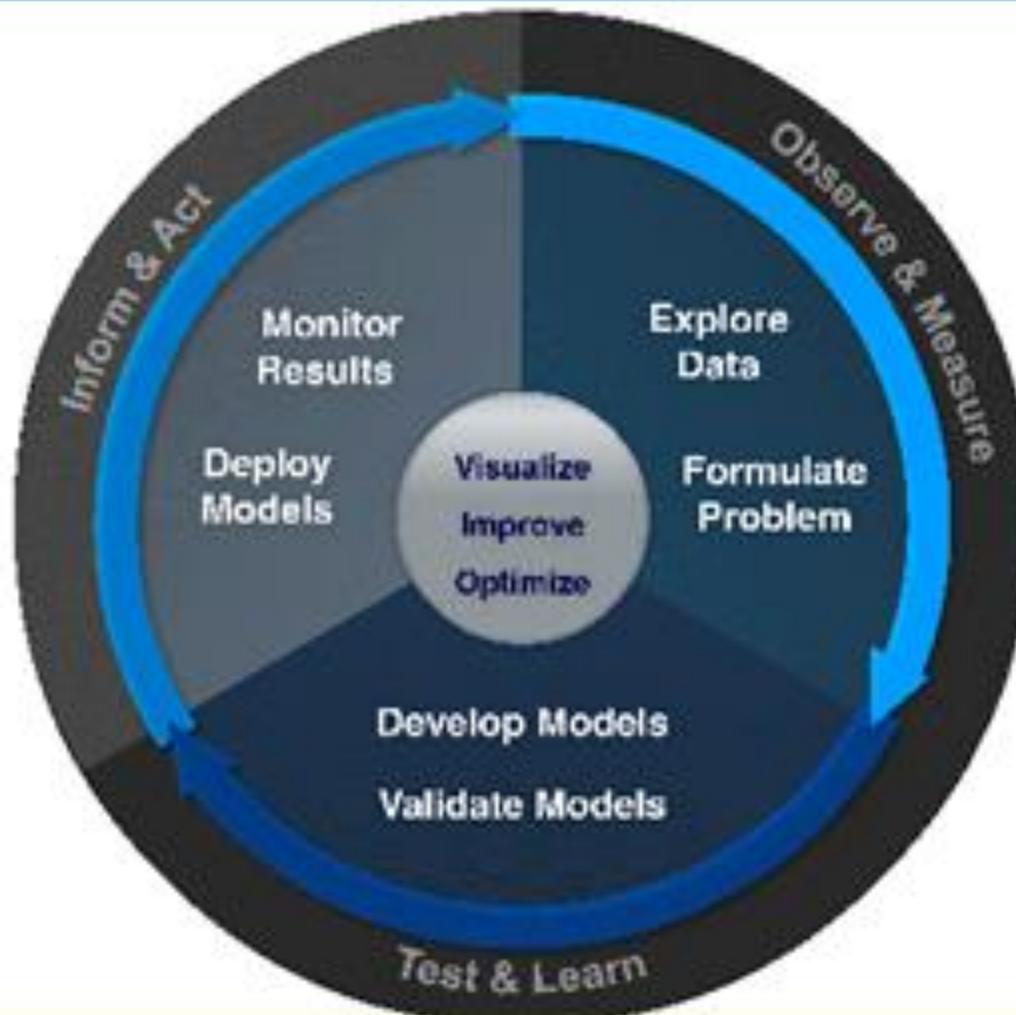
Kroeger (U.S.) uses mined data to profile customer buying behavior so they can better target coupons to make the store more appealing.

The ability to predict customer response to changes in business rules provides a powerful competitive advantage for the store.

- ❑ There are many different levels at which the analyses can help decision makers consider the business.
- ❑ The analyses can help decision makers understand
 1. What is happening in their organization?
 2. Why problems occur?
 3. What problems are likely to continue?
 4. What actions are best?
 5. How to take advantage of situations in the future?

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Figure 1.4: Uses of DSS in Business

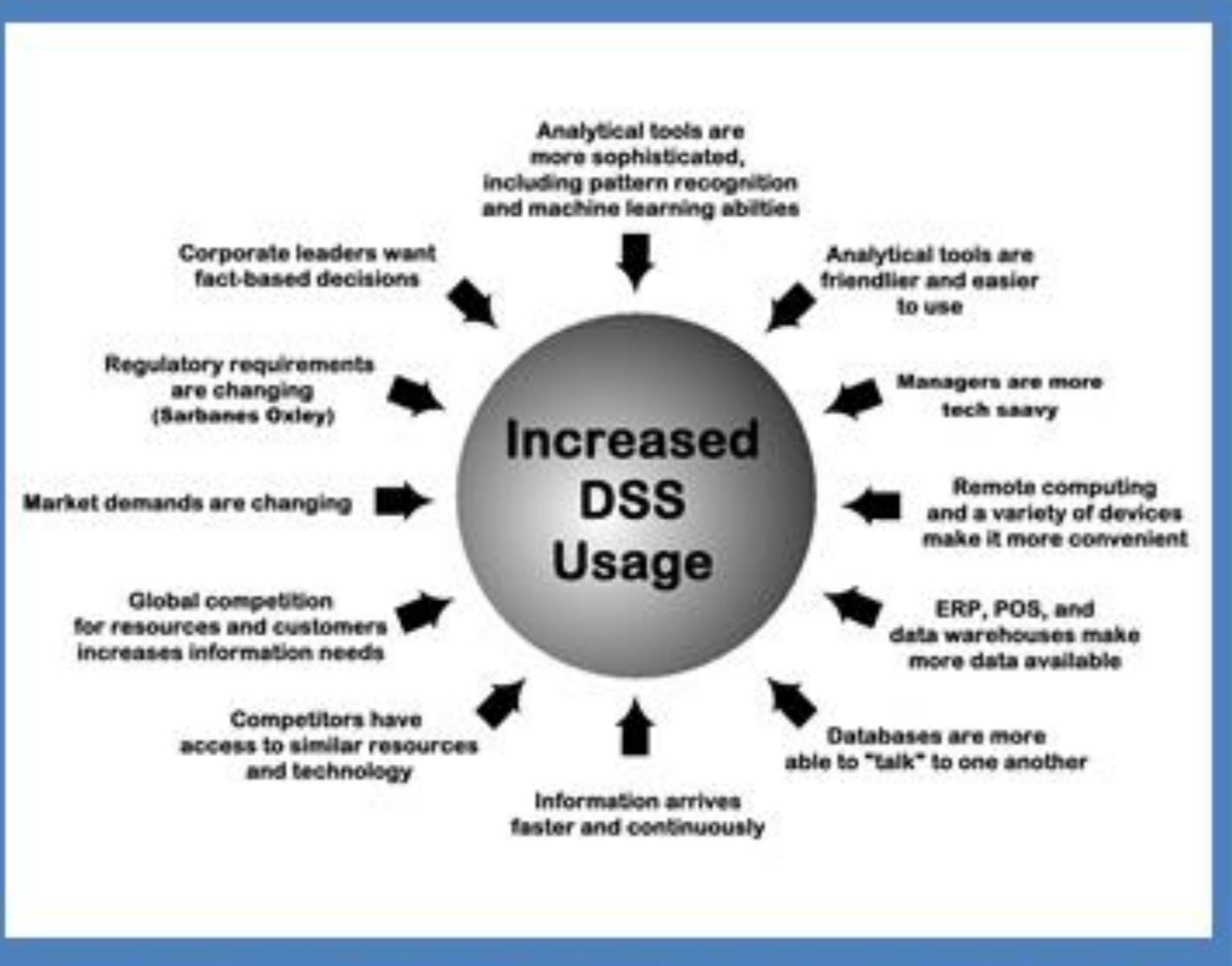


Why!!!

Companies Need Intelligent Systems?

- ❑ People have been making decisions for thousands of years without DSS.
- ❑ **In fact**, business managers have been making good decisions with good outcomes for many hundreds of years.
- ❑ Why should DSS technology now be important to the choice process?

Figure 1.5: Pressure to Build DSS



Any Questions



Thank
you

