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| 02 | Data and Knowledge Management: Database Approach, Big Data, Data warehouse and Data Marts, Knowledge Management. Business intelligence (BI): Managers and Decision Making, BI for Data analysisand Presenting Results |

Business Intelligence

What Is Business Intelligence?

The process of collecting, analyzing, and transforming raw data into actionable insights for business purposes is known as Business Intelligence.

Business Intelligence

- Business intelligence (BI) is a broad category of applications, technologies, and processes for gathering, storing, accessing, and analyzing data to help **business users make better decisions.** BI applications enable decision makers to quickly ascertain the status of a business enterprise by examining key information

Managers and Decision Making

- Management is a process by which an organization achieves its goals through the use of resources (people, money, materials, and information). These resources are considered to be inputs. Achieving the organization's goals is the output of the process. Managers oversee this process in an attempt to optimize it. A manager's success often is measured by the ratio between the inputs and outputs for which he or she is responsible. This ratio is an indication of the organization's productivity
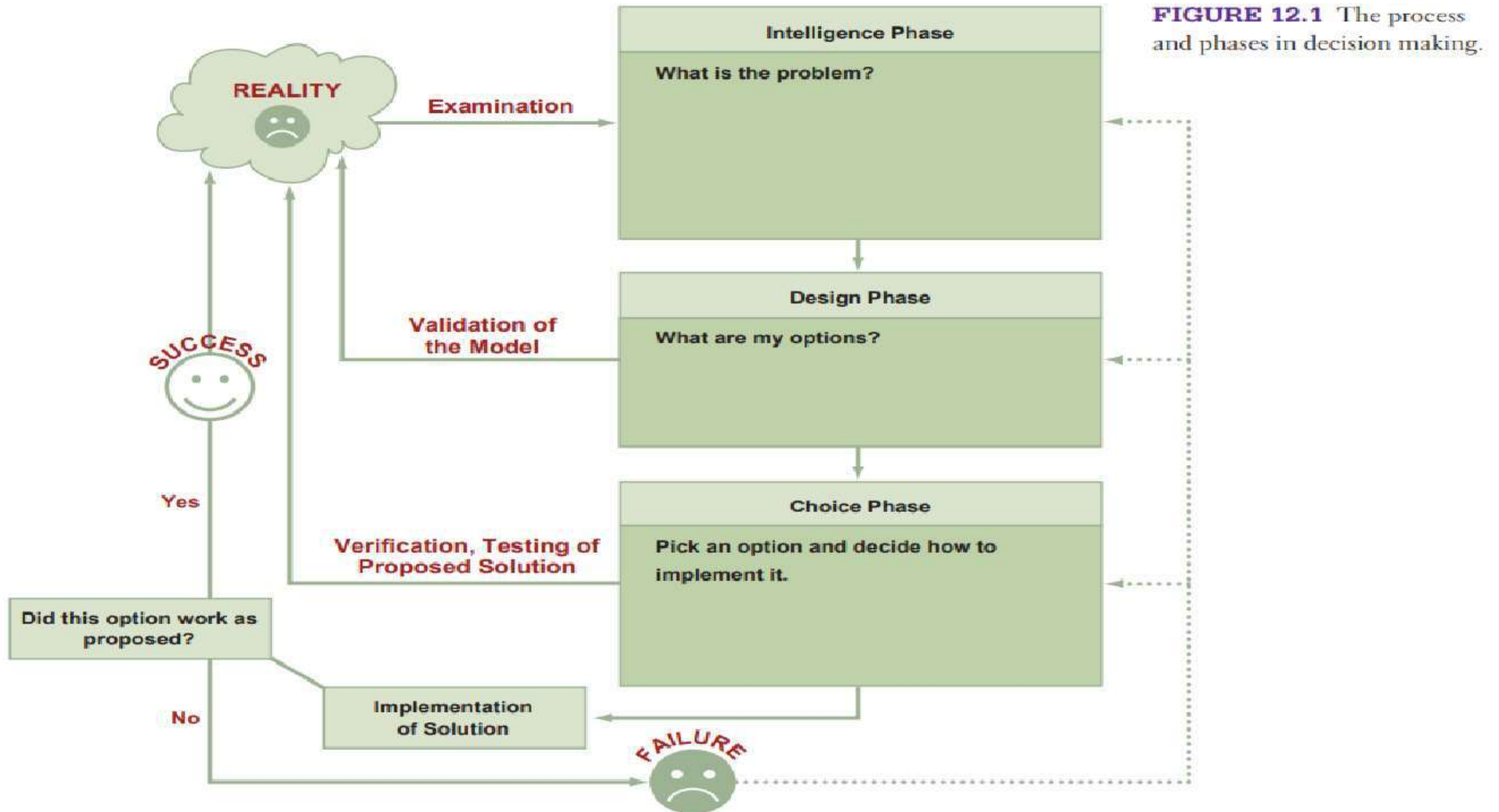
The Manager's Job and Decision Making

- To appreciate how information systems support managers, you fi rst must understand the manager's job. Managers do many things, depending on their position in the organization, the type and size of the organization, the organization's policies and culture, and the personalities of the managers themselves. Despite these variations, however, all managers perform three basic roles

- 1. Interpersonal roles: figurehead, leader, liaison

- 2. Informational roles: monitor, disseminator, spokesperson, analyzer
3. Decisional roles: entrepreneur, disturbance handler, resource allocator, negotiator

- A decision refers to a choice among two or more alternatives that individuals and groups make.

- Decisions are diverse and are made continuously. Decision making is a systematic process. Economist Herbert Simon (1977) described decision making as composed of three major phases: intelligence, design, and choice. Once the choice is made, the decision is implemented.

The Process and phases in decision making

FIGURE 12.1 The process and phases in decision making.

- The decision-making process starts with the intelligence phase, in which managers examine a situation and identify and define the problem or opportunity.

- In the design phase, decision makers construct a model for the situation. They do this by making assumptions that simplify reality and by expressing the relationships among all the relevant variables. Managers then validate the model by using test data. Finally, decision makers set criteria for evaluating all of the potential solutions that are proposed. The choice phase involves selecting a solution or course of action that seems best suited to resolve the problem. This solution (the decision) is then implemented. Implementation is successful if the proposed solution solves the problem or seizes the opportunity.

- If the solution fails, then the process returns to the previous phases. Computer-based decision support assists managers in the decision making process.

Why Managers Need IT Support

- Making good decisions is very difficult without solid information. Information is vital for each phase and activity in the decision-making process. Even when information is available, however, decision making is difficult due to the following trends:

- • The number of alternatives is constantly increasing, due to innovations in technology, improved communications, the development of global markets, and the use of the Internet and e-business. A key to good decision making is to explore and compare many relevant alternatives. The greater the number of alternatives, the more a decision maker needs computer-assisted searches and comparisons.

- • Most decisions must be made under time pressure. It often is not possible to manually process information fast enough to be effective.

- • Due to increased uncertainty in the decision environment, decisions are becoming more complex. It is usually necessary to conduct a sophisticated analysis in order to make a good decision.

- • It often is necessary to rapidly access remote information, consult with experts, or conduct a group decision-making session, all without incurring large expenses. Decision makers, as well as the information, can be situated in different locations. Bringing everything together quickly and inexpensively can be a major challenge.

What Information Technologies Are Available to Support Managers?

- In addition to discovery, communication, and collaboration tools that indirectly support decision making, several other information technologies have been successfully used to support managers. As you saw earlier, these technologies are collectively referred to as business intelligence (BI). BI is closely linked to data warehousing, which provides the data needed for BI.

What Is Business Intelligence?

- To provide users with access to corporate data, many organizations are implementing data warehouses and data marts

- . Users analyze the data in warehouses and marts using a wide variety of BI tools. Many vendors offer integrated packages of these tools under the overall label of business intelligence (BI) software. Major BI software vendors include SAS (www.sas.com) , Hyperion (www.hyperion.com , now owned by Oracle) , Business Objects (www.businessobjects.com , now owned by SAP), Information Builders (www.informationbuilders.com) , SPSS (www.spss.com , now owned by IBM), and Cognos (www.ibm.com/cognos)

- As you have seen, BI is vital to modern decision making and organizational performance. Let's consider in greater detail the technical foundation for BI and the variety of ways that BI can be used.

- The phrase business intelligence is relatively new.

- Business and IT analyst Howard Dresner coined the term in 1989 while he was an analyst at Gartner, a market research fi rm. The expression is especially popular in industry, where it is used as an umbrella term that encompasses all decision-support application

The Scope of Business Intelligence

- The use of BI in organizations varies considerably. In smaller organizations, BI may be limited to Excel spreadsheets. In larger ones, BI often is enterprisewide, and it includes applications such as data mining/predictive analytics, dashboards, and data visualization. It is important to recognize that the importance of BI to organizations continues to grow. It is not an exaggera

# Business Intelligence Applications for Data Analysis

- A good strategy to study the ways in which organizations use business intelligence applications is to consider how the users analyze data, how they present the results of their analyses, and how managers and executives (who can also be users) implement these results.

- data are stored in a data warehouse or data mart

- The user community analyzes these data employing a variety of BI applications. The results of these analyses can be presented to users via other BI applications. Finally, managers and executives put the overall results to good use.

- A variety of BI applications for analyzing data are available.

- They include

  1.multidimensional analysis (also called online analytical processing, or OLAP

  2.data mining,

  3.and decision support systems

Multidimensional Analysis or Online Analytical Processing (OLAP)

- Some BI applications include online analytical processing (OLAP), also referred to as multidimensional analysis capabilities. OLAP involves "slicing and dicing" data stored in a dimensional format, drilling down in the data to greater detail, and aggregating the data.

Data cube.
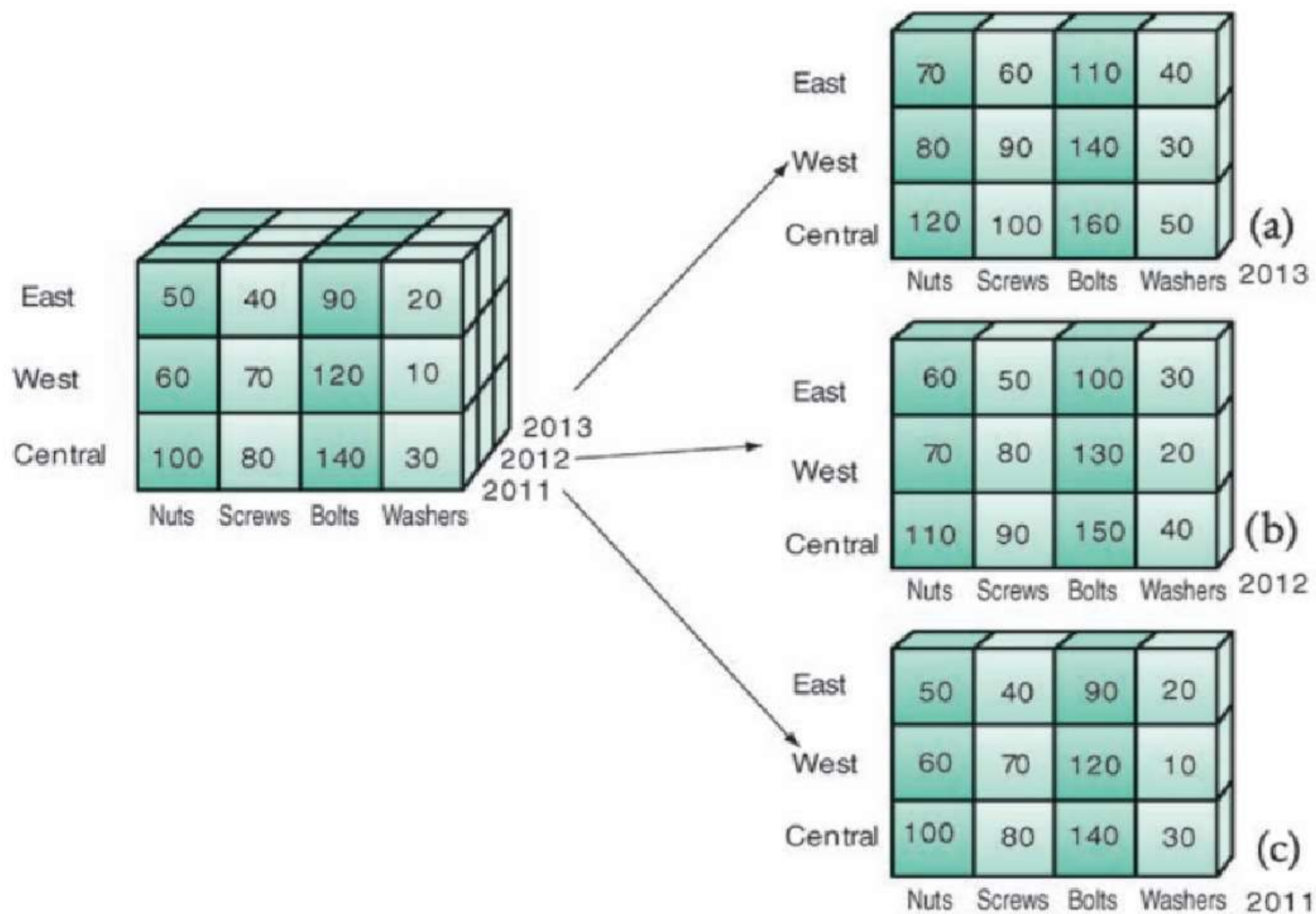
Multidimensional Analysis or Online Analytical Processing (OLAP)

- Fig showing the data cube. The product is on the x-axis, geography is on the y-axis, and time is on the z-axis. Now, suppose you want to know how many nuts the company sold in the West region in 2009. You would slice and dice the cube, using nuts as the specific measure for product, West as the measure for geography, and 2009 as the measure for time. The value or values that remain in the cell(s) after our slicing and dicing is (are) the answer to our question. As an example of drilling down, you also might want to know how many nuts were sold in January 2009. Alternatively, you might want to know how many nuts were sold during 2008–2010, which is an example of aggregation, also called "rollup.

Data Mining

- Data mining refers to the process of searching for valuable business information in a large database, data warehouse, or data mart.

- Data mining can perform two basic operations:

- (1) predicting trends and behaviors, and

- (2) identifying previously unknown patterns.

- BI applications typically provide users with a view of what has happened; data mining helps to explain why it is happening, and it predicts what will happen in the future

- In most cases the purpose of data mining is to identify a business opportunity to create a sustainable competitive advantage.

- • Retailing and sales. Predicting sales, preventing theft and fraud, and determining correct inventory levels and distribution schedules among outlets. For example, retailers such as AAFES (stores on military bases) use Fraud Watch from SAP (www.sap.com) to combat fraud by employees in their 1,400 stores.

- Banking. Forecasting levels of bad loans and fraudulent credit card use, predicting credit card spending by new customers, and determining which kinds of customers will best respond to (and qualify for) new loan offers.

- • Manufacturing and production. Predicting machinery failures, and finding key factors that help optimize manufacturing capacity.

- • Insurance. Forecasting claim amounts and medical coverage costs, classifying the most important elements that affect medical coverage, and predicting which customers will buy new insurance policies.

- • Policework. Tracking crime patterns, locations, and criminal behavior; identifying attributes to assist in solving criminal cases (e.g., see the chapter-closing case).

- • Healthcare. Correlating demographics of patients with critical illnesses, and developing better insights on how to identify and treat symptoms and their causes. IT's About Business 12.4 illustrates how a professional rugby team in Great Britain uses analytics to help prevent injuries to its players. • Marketing. Classifying customer demographics that can be used to predict which customers will respond to a mailing or buy a particular product

Business Intelligence Applications for Presenting Results

• The results of the types of data analyses you just learned about can be presented with

 1.dashboards and

2. data visualization technologies.

Today, users are increasingly relying on data that are real time or almost real time. Therefore, you also study real-time BI in this section.

Dashboard

- Dashboards evolved from executive information systems, which were information systems designed specifically for the information needs of top executives. Today, however, many employees, business partners, and customers can access an organization's digital dash

- boards.

FIGURE 12.3 Sample performance dashboard. (*Source:* Dundas Software, lemos1.dundas.com/Dundas Gauge/Marketing-Dashboard/Summary.aspx)

Data Visualization Technologies

- After data have been processed, they can be presented to users in visual formats such as text, graphics, and tables. This process, known as data visualization, makes IT applications more attractive and understandable to users. Data visualization is becoming increasingly popular on the Web for decision support. A variety of visualization methods and software packages that support decision making are available. Two particularly valuable applications are geographic information systems and reality mining

Geographic Information Systems

- Geographic Information Systems. A geographic information system (GIS) is a computerbased system for capturing, integrating, manipulating, and displaying data using digitized maps. Its most distinguishing characteristic is that every record or digital object has an identifi ed geographical location. This process, called geocoding, enables users to generate information for planning, problem solving, and decision making. In addition, the graphical format makes it easy for managers to visualize the data

Reality Mining

- One important emerging trend is the integration of GISs and global positioning(GPS) . Using GISs and GPSs together can produce an interesting new type of technology called reality mining. Reality mining allows analysts to extract information from the usage patterns of mobile phones and other wireless devices. If you want to catch a cab in New York City, the next example will show you how.

- Is there some kind of secret formula for finding a cab in New York City? The answer is, yes

- Singapore. The idea of making it easier to find a cab has traveled to Singapore. Commuters who cannot find a cab use an app that points them to places where they are more likely to fi nd one. The Agency for Science, Technology, and Research gathered sensor data from taxis on the road, including time, place, speed, and whether the taxis were occupied. Researchers developed a predictive mobile application that informs passengers where they are most likely to find empty cabs and cabbies where they are most likely to find fares. The app even tells train commuters where to get off the train so that they will have the best chance of finding a taxi. Interestingly, taxi companies in Singapore are not pleased with the app. They do not want the app to bypass their own dispatch systems.