



## *Friends-of-the-Firm Briefing*

# **Never Trust Your ERP System!**

## *How to Achieve & Maintain Information Systems Master Data & Operating Parameters Integrity*

Alan G. Dunn, President  
GDI Consulting & Training Company

**A must-read briefing for any manufacturing executive who is about to spend big money on integrated information systems implementation efforts**

*GDI Consulting & Training Company provides practical solutions to complex business and managerial problems. Focusing mainly on the manufacturing and distribution industries, GDI has developed a reputation as one of the most innovative and hardest working professional services firms in these industries.*

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## *Forward by Alan G. Dunn*

Dear Friends-of-the-Firm,

When computers were massively introduced into the manufacturing industry in the 1970's, life changed forever. Gone were the days when information was a personal asset. Born were new days where information would be shared and utilized by many individuals and groups. Unfortunately, manufacturing industry personnel, and perhaps all industry personnel, did not respond appropriately to this new reality. This has resulted in thousands of failed integrated systems implementation projects.

This **Friends-of-the-Firm Briefing** was developed because most integrated information systems have not come close to achieving the benefits promised by those who “sold” the systems to the leaders. This is not just our opinion; it is an irrefutable fact backed by surveys and discussions with manufacturing industry executives across the globe. Integrated information systems have often resulted in few financial and strategic benefits that outweigh their cost to implement. But there are some very puzzling twists within this fact.



When reviewing the technical information systems tools (i.e., software, hardware, etc.) we have come to the surprising realization that the tools are almost never to blame for information systems failures. Consistent with this conclusion, we have determined that in most companies, the people who participated in the implementation efforts were also not to blame for the failed payback. It appears that well over 60% of the time that information system implementations fail is because they were doomed from the outset. **This is often because no one was concerned about the quality of data going INTO the integrated information system.** This Briefing provides a proven methodology and set of enabling tools to correct this devastating condition.

It is difficult to imagine what life is like in a manufacturing company where everyone *really* believes and trusts the accuracy of information retrieved from their information and decision support systems. Because so many manufacturing companies have failed to implement integral data integrity systems alongside their modern information systems, second guessing of decisions is a common practice. Yet, through the implementation of the simple tools presented in this Briefing, companies across the globe are discovering the joys and many new efficiencies that come with accurate master file data and appropriately set system parameters. Implement the techniques described in this Briefing and you can join the ranks of those who trust their integrated information systems.

Enjoy your reading.

A handwritten signature in black ink that reads "Alan G. Dunn". The signature is written in a cursive, flowing style.

Alan G. Dunn  
President  
GDI Consulting & Training Company

## Never Trust Your ERP System!

Executives are finding it increasingly difficult to make sound business decisions as integrated information systems infiltrate their organizations and proliferate among their decision makers. This is contrary to the contemporary belief that these systems provide executives with all the pertinent information necessary to make rapid, effective and timely decisions. Yet, the truth is hard to dispute. Business executives are making an increasing number of bad decisions because the data used by the trusted information system is often incomplete, inaccurate or misleading. Executives must stop blindly trusting the data processed by their automated information systems if they are going to improve the quality of their decision making.

When computers were introduced into company operations, the very fabric of the management decision making process changed. Executives who previously maintained control of the data within their information systems no longer had the same level of control over the integrity of the data. Data is now input to a computer by someone far removed from the executive decision maker and manipulated by complex programs which are maintained by technocrats even further removed. And yet, executives continue to trust, without question, the reports and inquiries emanating from their computers. They continue to make significant decisions using information that is based on faulty data. These same executives do not seem to be concerned that the faulty data practically assures the existence of faulty information that almost always leads to faulty decisions. It seems that "*real-time*" and "*on-line*" has come to mean "the ability to make significantly bigger mistakes significantly quicker than ever!" This unquestioning trust of data must end if input data is ever to become usable output information.

The need for executive trust of computer data has created an **entirely new management responsibility** within the computerized environment. Executives need to know something of the quality of the data which is behind the reports used in their day-to-day decision making process. Monitoring the condition of the data used in the decision making process is no longer a periodic task undertaken when an identifiable string of bad decisions are made. It is now a **mandatory** part of the decision making process itself. No longer can an executive be responsible solely for reporting economic, departmental or functional performance. Just as skilled scientists routinely test the integrity of data in their experiments, today's executive must monitor, test and report the condition of data utilized in key decisions.

A level of trust in the data behind the report must be inferred before significant business decisions can be made using the information depicted on the report. Remember, raw data goes into a computer system... usable information is what is supposed to come out. Input poor quality data and the output information will more than likely be untrustworthy. This is especially true in today's integrated system environments where everybody's remotely input data can contribute to everyone's remotely executed decision making information.

To improve management decision making vis-à-vis improved quality of input data, management will need to execute three new and distinct tasks within the context of using their automated information systems. These are:

- 1. Monitor, report and control the completeness of master file data.**
- 2. Monitor, report and control the accuracy of master file data.**
- 3. Monitor and report the effectiveness of master file.**

There are laws of gravity. There are laws of physics. There are laws of nature. There are also laws of decision making. One of these laws is that data going into a computer will weave the fabric of the decision making process and ultimately the results of the decision. Before executives move ahead with major systems implementations, executives should first move ahead with a program to focus attention on the data used in the decision making process. This is the equivalent of applying Statistical Process Control (SPC) techniques to the management

information function. Manage the inputs and the natural output from the process will be good. This will require techniques presented in the following sections.

## Executive Decision Making Requirements

Management decision making requires information. Most executives prefer complete, accurate and timely information for routine decision making. Good information requires good data. If anything else is used, a good decision is probably little more than a lucky decision!

**Exhibit 1**  
**Effects of Good Data on the Decision Making Process in a Computerized Environment**

All business decisions result in one of three outcomes. These are:



1. **Good results**
2. **Neutral results**
3. **Bad results**

Surely, executives would not make decisions hoping for neutral or bad results. The purpose of a decision is to provide value and improve one's position or environment. Therefore, only two rational results can be expected from any business decision. They are:

1. **Good results**
2. **Bad results**

Common sense suggests that good and bad results can be derived from decisions using good and bad data. Common sense also suggests that the likelihood of positive results are greatly enhanced with the use of good data, whereas poor data increases the likelihood of poor decision results. Exhibit 1 presents the relationship between good data quality, decision results, future data development and future decision making.

Exhibit 2 demonstrates what happens when bad data is introduced into information systems that supports the decision making machine. Note that while bad data usually supports a high probability of a bad result from any given decision, it almost always creates additional historical bad data which tends to geometrically increase the probability of future bad decision results.

**Exhibit 2**  
**Effects of Bad Data on the Decision Making Process in a Computerized Environment**



An example of this phenomenon can be seen in the average manufacturing company. Purchasing Managers often make inventory procurement decisions based on inaccurate on-hand inventory balance data. Perhaps the computerized perpetual book record indicates an on-hand balance of 50 units of a given item while in reality there are only 20 units. When an issuance transaction for 20 units occurs and the computerized inventory book record drops to 30 units, the Purchasing Manager may reorder the inventory item, thinking that the item is now below its order point, which was previously set at 35 units. The reorder point is derived from the amount of time normally required for the remaining inventory of the particular item, (35 units in this case) to drop to a zero balance.

If, however, the data is inaccurate and the true inventory balance is 30 units less than the computerized perpetual record indicates, then the true balance after the 20 unit transaction will be 0. The problem with this scenario is that while the Purchasing Manager *thinks* he has 30 units on the shelf and that they satisfy normal demand until the new order arrives, he actually has no units on the shelf... but doesn't know it! He will only discover the problem when he goes to the shelf and discovers that the true balance is 0, 30 less than the computerized perpetual record indicates. Because the Purchasing Manager needs inventory NOW and has no time to wait for the normal delivery cycle to occur, a panic purchase of new inventory with airfreight transportation is used to shorten the cycle.

At the end of the fiscal year, the Controller reviews the general ledger account balances and discovers excessive airfreight charges. The subsequent cost reduction program usually addresses techniques to reduce airfreight instead of techniques to improve inventory record accuracy. Thus, the real culprit and problem are masked by a solution chasing a symptom! From this example, we can see that:

- 1. Bad data can and often does precede good and bad decisions.**
- 2. Bad data is virtually never self-purging.**

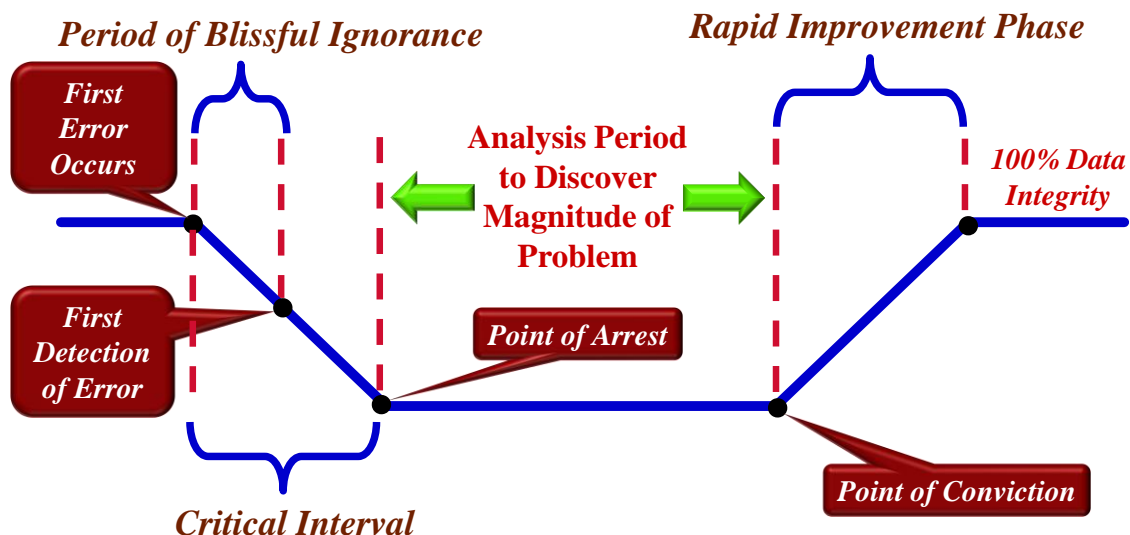
3. **Bad data in the decision making process usually promotes a high probability of future bad decision results.**
4. **Bad data always creates future bad data if not consciously and deliberately purged from the decision making system.**

Exhibit 3 demonstrates the damage that can be caused by poor master file data accuracy. The “error life cycle” of a data element can be viewed in four distinct time periods:

1. **The Period of Blissful Ignorance...** this is the period where data in a particular master file is degrading but no one knows it! There has not yet occurred a large enough sample of errors to show up on anyone’s “data radar”. Everyone assumes the data is accurate when in fact it is deteriorating rapidly.
2. **The Critical Interval Period...** this period includes the Period of Blissful Ignorance as well as the period between first sign of a problem (First Detection Point) and discovery of the cause of the problem (Point of Arrest). This period is especially critical because while knowledge may exist that a data problem is occurring, the data quality continues to deteriorate while the “data cops” search for the root causes. This is why companies need pre-developed routines for seeking out the underlying causes of data errors in order to rapidly and efficiently fix the problem. We have seen master file data integrity drop by over 85% while this search is occurring in companies without such tools!
3. **The Period of Correction & Reconstruction...** this period includes all activities associated with determining how to sort the good data from the bad. And while the quality of the data may not be improving, it is at least not getting worse. The problem has been identified and a plan to return to 100% is being drafted. The data “blood letting” has stopped.
4. **The Rapid Improvement Phase...** finally, the cause has been identified and a solution for isolating good data from bad has been developed. Now the poor data can be reviewed and corrected, bringing the file back to its original condition.

Notice that the small period of time that the data integrity is deteriorating (prior to the first detection point) actually leads to the long period of time to recover the original 100% data accuracy level. Anyone who has ever had to research and recover a damaged file knows that small errors can lead to substantial analysis and recovery work... sometimes requiring more than a hundred times more time and effort to fix the error than it took to originally create the error!

Exhibit 3  
Life Cycle of Data Errors



In summary, bad data begets bad data at an increasing rate! If bad data proliferates and is allowed to continue long enough, the probability of good decision results from any decision making process can be infinitesimally small.

## How to Significantly Increase Master File Data Integrity

Improved decision making in the computerized company requires improved data integrity. This requires that master file data elements be identified and systematically improved to a point where executive trust is no longer in question.

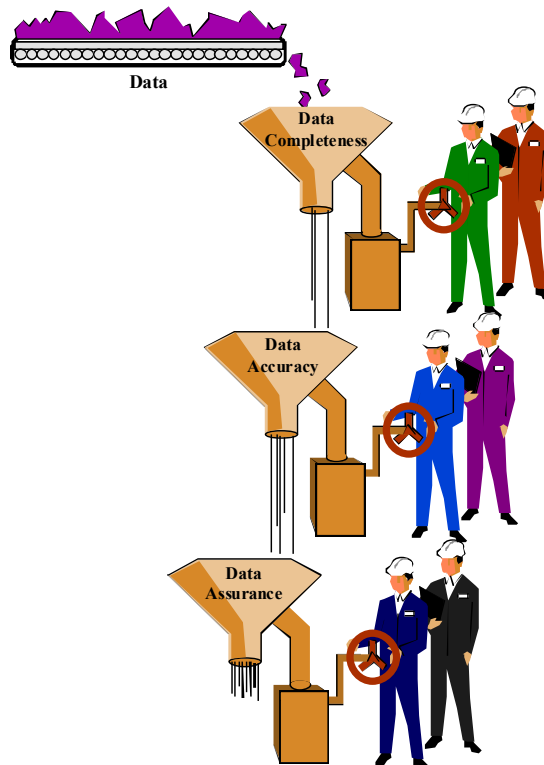
To achieve trust in master data files, leaders must work by a new set of rules. These new rules, as depicted in Exhibit 4, must exist in any company that utilizes computers to process decision making data. Leaders must insist that a new set of disciplines be religiously followed each day. These new disciplines include:

- 1. Insist that data being input to master files be complete.**
- 2. Insist that data being input to master files be accurate.**
- 3. Insist that all data be input in a timely manner.**
- 4. Insist that the condition of the data be regularly monitored and that quality of data be regularly reported.**

I do not believe it makes sense to insist on timely and accurate data until all data necessary for decision making is present within the master files which drive our information systems. As depicted in Exhibit 4, data must first be present in the master files before it can be made accurate.

Further, data assurances cannot be achieved until data accuracy, at some level is achieved. Therefore, I will address data integrity in a step-by-step fashion starting with techniques to develop data completeness and then move into data accuracy and complete with a plan for monitoring master file data integrity.

**Exhibit 4  
Data Requirements**

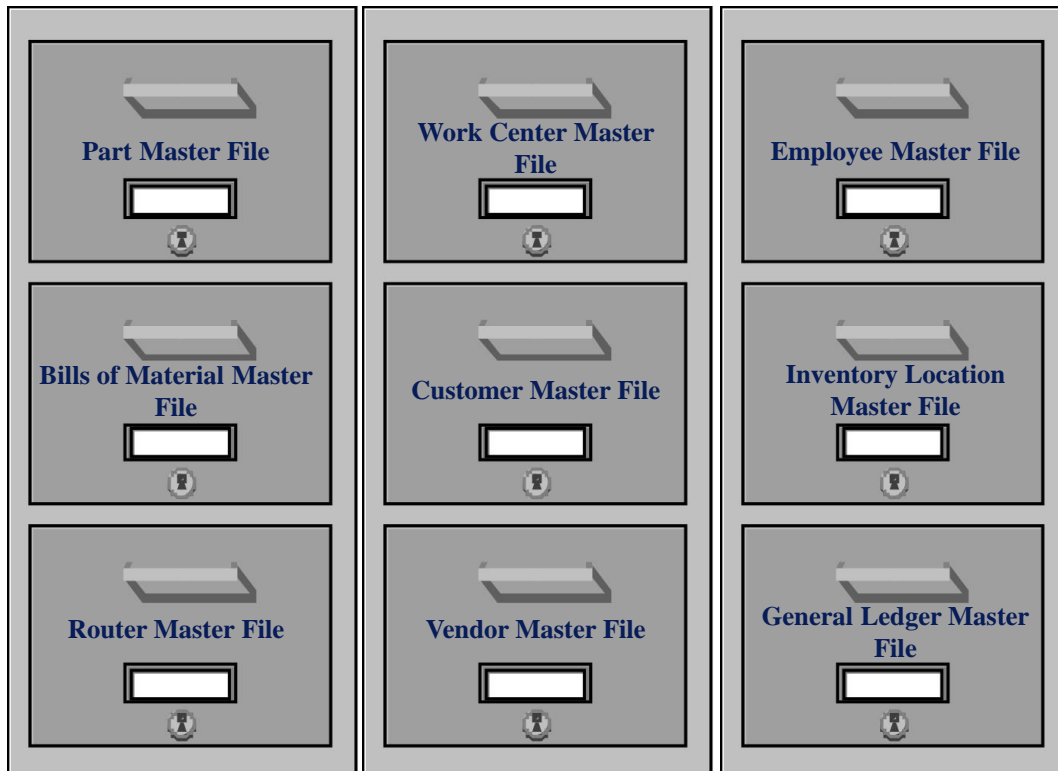


## The First Step... Data Completeness... Developing the "User's Missing Data Reports"

Before insisting on completeness of data you must first identify data files in your computer system that routinely affect business decisions. Exhibit 5 presents a picture of the typical master files that exist in most integrated manufacturing software products. Each of these files serves a unique purpose as described in the following narrative.

1. **Customer Master File...** a listing of all static data about each customer. Data elements in this file may include customer number, name, address, geographic code, contact names, credit status, assigned sales representative, etc.
2. **Vendor or Supplier Master File...** a listing of all static data about each supplier. Data elements in this file may include vendor number, name, address, certification number, source inspection data, assigned buyer, etc.
3. **Item (or Part) Master File...** a listing of all static data about each part number. Data elements in this file may include part number, description, lead time, lot size, safety stock, commodity code, product code, order multiple, drawing number, unit of measure, unit of issue, qualified vendors, alternate part, buyer code, planner code, part cost, part price, material burden value, etc.
4. **Work Center Master File...** a listing of all static data about each work center. Data elements in this file may include work center number, description, capacity, utilization factor, efficiency factor, labor rate, burden rate, overhead rate and alternate work center.
5. **Employee Master File...** a listing of all static data about each employee. Data elements in this file may include employee number, name, address, shift, job code, pay rate, pay basis, etc.

**Exhibit 5**  
**Typical Master Data Files in a Manufacturing Company**





6. ***Bills of Material (or Product Structure) Master File...*** a listing of what goes into a part. Normally this includes the list of part numbers and the quantity per relationship.
7. ***Chart of Accounts Master File...*** a listing of all account numbers used in the general ledger system. Data elements in this file may include the general ledger number, description, department, expense category, origin codes, etc.
8. ***Routing or Bill of Operations Master File...*** a listing of work centers that a part goes through during the manufacturing process. Data elements in this file may include operation numbers, operation descriptions, work centers, set up standards, run time standards, alternate operations, alternate work centers, outside processing cost, lot size, work instructions, drawing number, etc.
9. ***Inventory Location Master File...*** a listing of the locations where each inventory item is stored. Data elements in this file may include part number, description, location number, lot number, quantity, etc.

It is useful to develop a “*Plain English Data Dictionary*” that describes in detail how each data element is used. Of special note are the “*permissible entries*” for each data element that need to be specified before any file can be tested for data completeness or data accuracy. A sample “*Plain English Data Dictionary*” can be seen in Exhibit 6.

**Exhibit 6**  
**Plain English Data Dictionary Sample**

**\*\*\*\*\* Product Group Master File \*\*\*\*\***

**This master file contains most of the static information elements needed to describe a “Product Group”. This information is effectively a sort code used for sorting many other master files.**

***General Data Element Characteristics***

Data Element Identifier	PersonID
Data Element Name Or Description	Planner ID
How Critical Is This Data Element To Successful Use of the Information System?	High

***Data Element Integrity Management***

Purpose and/or Use Of Data Element	This element identifies the person to be used as the Production Planner. This person is responsible for handling the manufacturing suggestions of parts in this Product Group. Used as the default for "new" manufacturing suggestions and on Job Header. Manufacturing suggestions can be filtered by Planner. Relates to the “PERSON” table.
Permissible Entries	Must always be the employee number of the planner.

Input Default Value	None allowed.
Is This Data Element Mandatory, Optional Of Conditional?	Mandatory.
Who Is Accountable For The Integrity Of This Data Element?	Ben Franklin, Sales Manager.
How Is This Data Element's <u>Accuracy</u> Measured?	Compare this data element with valid employee records in the "PERSON" file.
What Is "Good" Accuracy?	No more than one incorrect record.
How Often Should This Data Element Be Reviewed For Missing Data?	Daily.
How Often Should This Data Element Be Reviewed For Data Accuracy?	Data Review Reports will cycle through this data every 3 months.
How Often Should This Data Element's Level Of Data Integrity Be Reported?	Leader's Data Integrity Monitoring Reports are prepared and distributed monthly.
Who Should Be Informed Of This Data Element's Integrity?	President, GM, CFO.

***Data Element Technical Characteristics***

What Is The Data Element "Type"?	Character.
Is This Data Element Validated Upon Input?	Yes.
What File(s) Does This Data Element Validate To?	Against the "PERSON" file.
Is This Data Element Calculated, Manually Input Or "Copied" Into This File?	Copied from the "PERSON" file provided drop down box.
Data Element Size	8 characters.
Data Element Format Characteristics	Alpha and/or numeric.

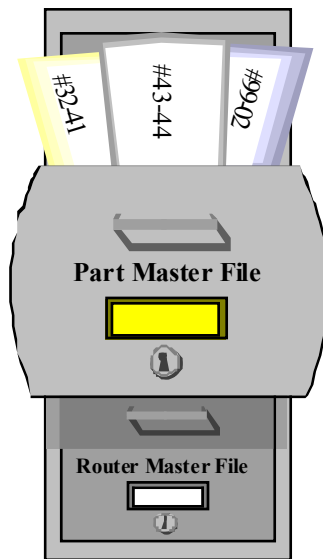
***Data Element Maintenance***

Screen Name(s) Used For <b>Adding</b> This Data Element To This File?	PAS-332, PAS-333, PAS-400
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Who Is Responsible For <b>Adding</b> This Data Element To This File?	Sam Dixon, Fred Muckenfuss, Sally Whatsit, Rob Renaldy, Janice Slauson.
Screen Name(s) Used For <b>Changing</b> This Data Element In This File?	PAS-332, PAS-337, PAS-400, FFS-392, FFS-399
Who Is Responsible For <b>Changing</b> This Data Element In This File?	Sam Dixon, Sally Whatsit, Rob Renaldy, Jason Dillard, Mable O’Henry, Susan Shore.
Screen Name(s) Used For <b>Deleting</b> This Data Element In This File?	PAS-332, PAS-339, DDF-500, DDF-502
Who Is Responsible For <b>Deleting</b> This Data Element In This File?	Sam Dixon, Fred Muckenfuss, Joanne Rodriquez, Diane Campbell, Mark Hoffstetter.
What Reports, Processes & Inquiries Use This Data Element?	INQ-300, INQ-301, INQ-302, INQ-303, INQ-400, INQ-401, INQ-403, REP-100, REP-200

Once the identification of master files has been completed, you must set in motion a monitoring program to **systematically and automatically** report data that is missing from each file. This can be accomplished with the User’s Missing Data Reports. These reports identify, on an exception basis, any data elements that are missing from a specific master file and is the responsibility of a given department or individual. When designing these reports, you should remember the following characteristics:

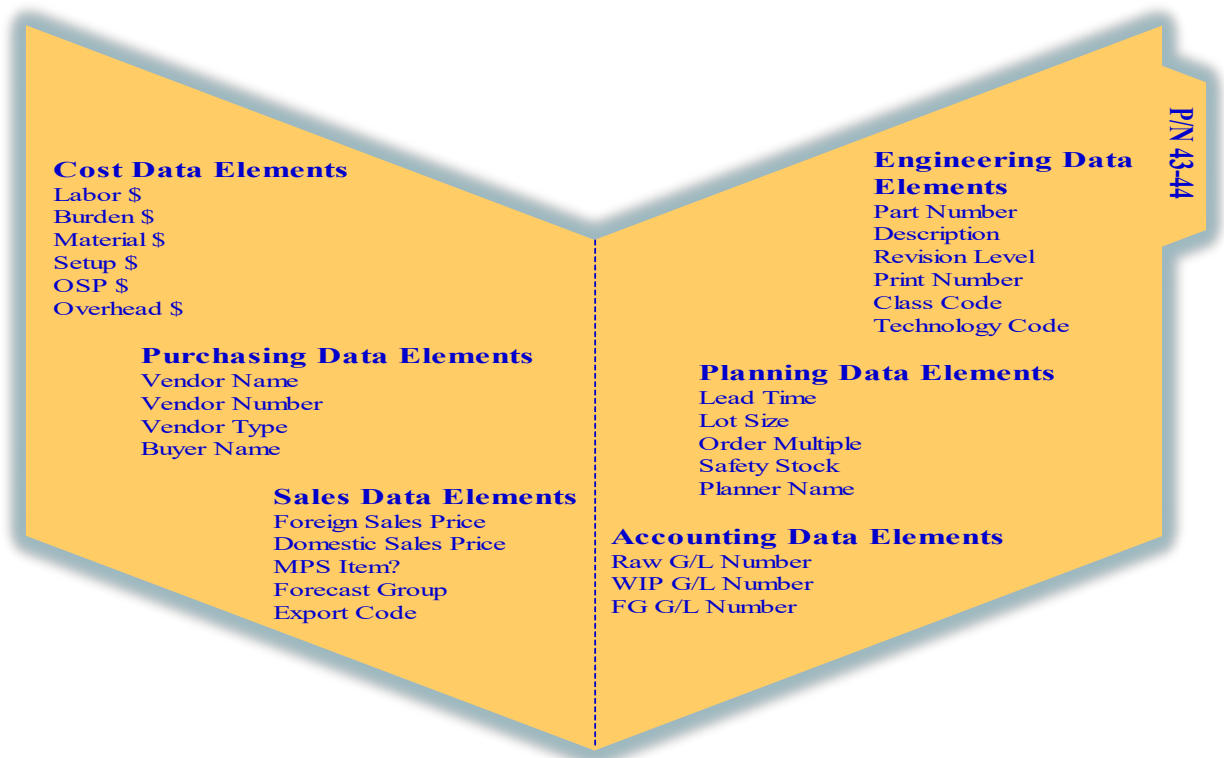
**Exhibit 7  
 What's In A Master File?**



1. The report should list all master file data elements that are the responsibility of a particular department. Any record that is missing any element will be listed on the report. An example of the types of data a master file may contain, and how it can be assigned to responsible parties can be viewed in Exhibit 7. The missing element should be clearly identified and described in plain language.

2. The report must be cumulative. This means that someone is responsible for inputting incomplete data elements every day (in order to complete the record). If missing elements are not input the first day they appear on the report then they will appear the next day with new records missing one or more elements.
3. When two or more departments have responsibility over one or more data elements, the result will be a single report for each department.
4. The report should be sorted in a logical fashion. This can be by:
  - Part number in either ascending or descending sequence
  - Vendor number or name
  - Customer number or name
  - Buyer code or name
  - Planner code or name
  - Work center number or name
  - Employee number or name
  - General ledger account number

**Exhibit 8**  
**Item Master Data**

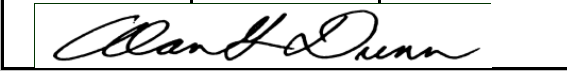


5. The report should be automatically generated each night. Users cannot request these reports. They must be processed every night!

- The report should be distributed systematically each morning to the department supervisor responsible for the data elements listed on the report. Distribution can occur in either hard copy or electronically. In either case, the distribution must occur in a systematic, religious and institutionalized fashion.

A sample of a report for missing data is provided in Exhibit 9. This exhibit outlines data elements missing from an Inventory Item Master File. In this example, the column headings identify elements that are the responsibility of the Purchasing Department. The report is automatically streamed and generated each night and routed to the Purchasing Department each morning. Upon receiving this report, the Purchasing Supervisor assigns the list (or portions of the list) to the accountants for review. Within minutes, all missing data elements are entered into the computer system. The subsequent day's report will not list these items.

**Exhibit 9**  
**Sample User's Missing Data Report**

<b>Item Master File Missing Purchasing Function Data</b>					
<b>Part #</b>	<b>Lead-Time</b>	<b>Lot-Size</b>	<b>Safety Stock</b>	<b>Unit of Measure</b>	<b>Price</b>
13-746-00	12 weeks	?	200	Each	\$38.50
13-835-01	10 weeks	?	?	Each	?
18-444-88	?	200	400	?	\$200.05
19-333-84	2 weeks	50	300	Set	?
21-200-90	9 week	100	300	Pair	?
<b>Records With Missing Data:</b>			<b>5</b>	<b>October 2, 2009</b>	
<b>Total Missing Elements:</b>			<b>8</b>		
<i>I certify that to the best of my knowledge, the above corrections to this master file's data, which I am personally responsible, is correct.</i>					
<b>Signed:</b>				<b>Date:</b> <b>10/4/2009</b>	

It is important that the User's Missing Data Reports be processed each night. Interactive, on-line computer systems provide users with the ability to use data in decision making shortly after its creation. In more interactive systems, using incomplete data can result in significant management errors.

One company began issuing and receiving inventory prior to a standard cost being input by the company's Cost Accounting Department. Though this appeared to be a minor problem at the time, it resulted in a significant imbalance of pieces and dollars moving into work-in-process inventory. This subsequently resulted in an untimely year end write-down of inventory assets coupled with an unforgettable write-up of cost-of-sales. The final result was a restatement of earnings... lower, of course!

## The Second Step... Data Accuracy... Developing & Using the "User's Cyclic Data Review Report"

There is no way to assure trust in existing data without periodically reviewing the data. This means that employees must review computer data, either on-line or in printed form, on a routine basis to assure that files are:


1. **Current**
2. **Accurate**
3. **Sensible**

To perform this periodic review, we suggest the use of "User's Cyclic Data Review Reports". These reports are used to periodically review all elements which are the responsibility of specific functions or departments within an organization. Specifically, characteristics of these reports are:

1. **They must be generated automatically each night. The report should be printed in work sheet format or presented as a formatted screen if performed on-line.**
2. **They must be reviewed systematically and formally each day by appropriate department personnel.**
3. **Changes must be noted, approved and input on a daily basis. Additionally, routine changes to existing data and corrections to existing data must be separately identified.**
4. **Reviewing employees are required to sign their names to the data, indicating that all data has been reviewed.**
5. **Leaders must commit necessary resources to provide review capabilities.**

A sample of a "User's Cyclic Data Review Report" work sheet is presented in Exhibit 10. This particular report is designed to cyclically review two Item Master Records on a daily basis. Note that the report is for the Purchasing Department and is divided into sections corresponding to a probable internal Purchasing Department organization structure.

**Exhibit 10**  
**Sample User's Cyclic Data Review Report**

Item Master File Cyclic Review of Purchasing Function Data			
Part #:	13-746-00		
Description:	850 x 8 tire & rim assembly		
<b>October 8, 2009</b>			
	<b>Existing Data</b>	<b>Revised Data</b>	<b>Revised By</b>
Lead-Time:	12 weeks	10 Weeks	A. Dunn
Lot-Size:	200	No Change	
Standard Cost:	\$39.50	No Change	
Current Price:	\$39.57	\$40.41	A. Dunn
12-Month Future Price:	\$41.99	\$42.55	A. Dunn
Order Multiple:	50	No Change	
Source Supplier(s):	Frank's Tires Keystone	Frank's Tire Currie, Inc.	A. Dunn
I certify that to the best of my knowledge, the above corrections to this master file's data, which I am personally responsible, is correct.			
Signed:			Date: 10/7/2009

In our example, the computer will, each night, generate and print ten work sheets for randomly selected Item Master records. A flag is established so no Item Master is reviewed twice prior to all other Item Master records being initially reviewed. If an Item Master Data Review Report does not have input action the day after printing, it will appear in the next day's run of work sheets. Therefore, if ten records are reported each night and two are not input or verified, then the Purchasing Department will receive twelve reports on the following day. Thus, the cumulative logic forces timeliness of updating. Certainly, most people work better when they know exactly what is expected of them... each and every day!

The Data Review Work Sheets are routed to the Purchasing Manager each morning. The Manager will normally disseminate them among the buyers, requiring all information be completed on the work sheet and presented back by noon each day. The data is then reviewed, approved and input as appropriate. Certain override capabilities should be provided under strict system security control.

### **The Third Step... Data Monitoring... Developing & Using Leadership Data Integrity Monitoring Reports**

There are two types of reports that leaders utilize in the decision making process. The most prevalent type of report is the Performance Report. This report typically summarizes certain key operating or performance statistics. Examples within a manufacturing company might include:

- **Future purchase order commitments by commodity type**
- **Actual expenses to budgeted expenses by department**
- **Aged accounts payable by supplier within division**
- **Inventory valuation by general ledger account number**
- **Aged accounts receivable by division**
- **Employee absenteeism by department**
- **Mean-time-between-failure (MTBF) by product line**
- **Asset and investment turnover statistics**
- **Receiving inspection throughput times**
- **Quality rejections per sales dollar**

These and many other leadership performance reports have become the source documents for many management decision making processes. Of course, trusting the numbers in these reports requires trusting that the underlying data is truly accurate.

Harold Geneen, past President and Chairman of the Board of ITT once suggested that a manager can run the business by the numbers, as long as the numbers reflect reality. Additionally, he states that a manager must not simply review summary data but must understand the details behind the summaries. Translated, this means that executives must prove that the details add up to the summary values!

To assure the timeliness of performance reporting, a manager must provide an analysis staff or MIS department with a catalog of management reports. It is the manager's responsibility to develop this catalog, outlining all reports needed, their distribution and frequency of reporting. Properly designed, the catalog could be divided into two sections:

## 1. Leadership Data Integrity Monitoring Reports

## 2. Performance Reports

A sample catalog of reports typically needed by a Vice President of Manufacturing is included as Exhibit 11.

**Exhibit 11  
 Management Performance Report Catalog**

Report Title	Report ID	Goals	Accountable Individual	Telephone Extension	Director of Engineering	Controller	Purchasing Manager	ME Manager	IE Manager	COO	CFO	CEO
Part Master File Missing Engineering Data Elements	MDR-001	Less Than 20 Missing Data Elements	Robert Muckenfuss, Director of Engineering	x 293	Yes					Yes		
Part Master File Missing Accounting Data Elements	MDR-002	Less Than 10 Missing Data Elements	Roberta Dryfuss, Controller	x 232		Yes					Yes	
Part Master File Missing Purchasing Data Elements	MDR-003	Less Than 20 Missing Data Elements	Jose Rameriz, Purchasing Manager	x 221			Yes			Yes	Yes	
Bills of Material Master File Statistical Accuracy Report	SAR-001	99% With 0 Tolerance	Robert Muckenfuss, Director of Engineering	x 293	Yes	Yes		Yes	Yes	Yes	Yes	Yes
Router Master File Statistical Accuracy Report	SAR-002	99% With +- 2% Tolerance	Janice Hodges, Manufacturing Engineering Manager	x 266	Yes			Yes	Yes	Yes		
Master File			Phyllis McDonald, Industrial Engineering									

Most organizations with computerized information systems find it necessary to assign an individual with complete responsibility for gathering data into a report package for the executive. A key to effective decision making is that all reports in the report catalog must be completed and presented to the executive on schedule. If the catalog calls for an Accounts Payable Register each Friday, then the Accounts Payable Register will be developed and presented each Friday. Not Monday... not the previous Thursday... but Friday. Each week or month, a report package will be assembled with the checked-off items on the checklist cover sheet attached. This will be submitted to the executive for his/her review.

Characteristics of timely management reporting can be summarized as follows:

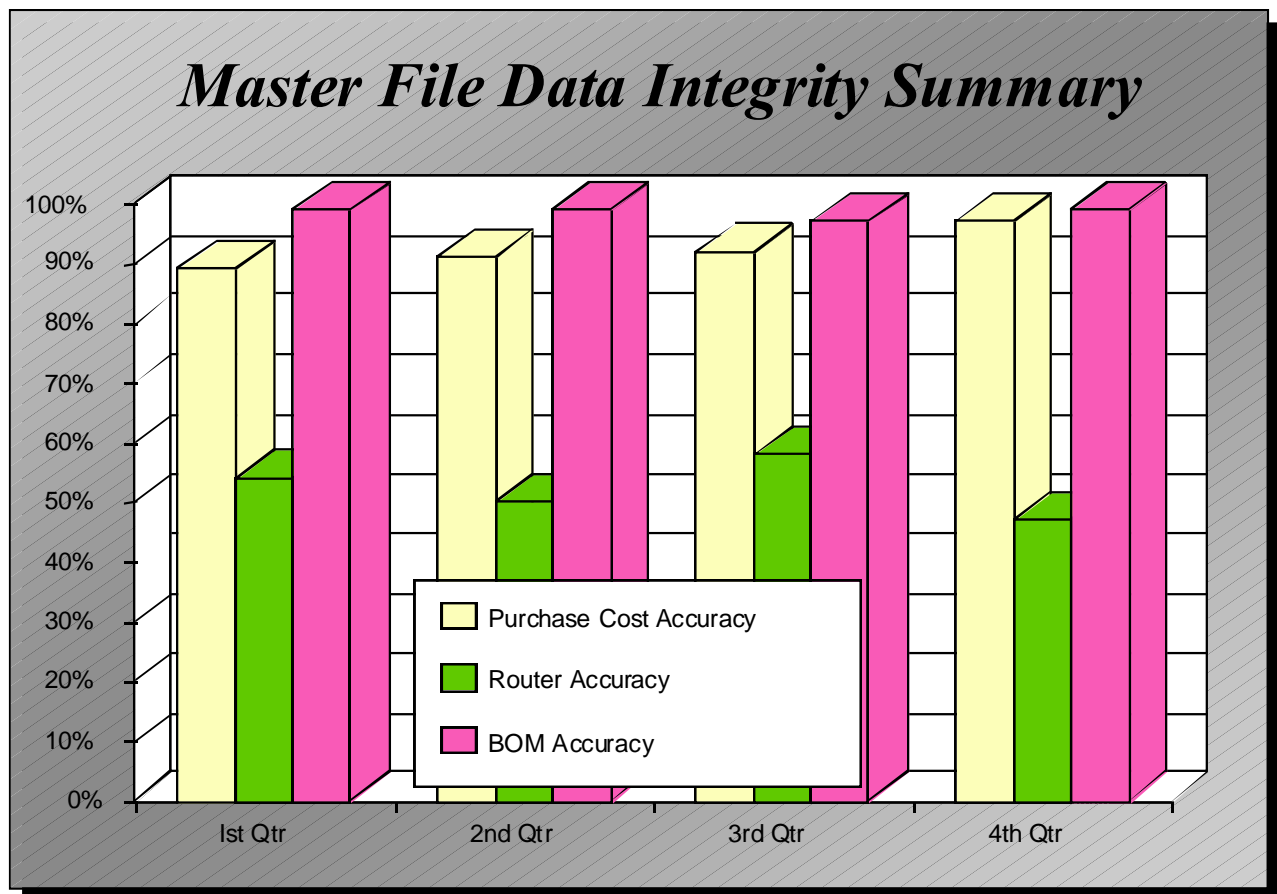
- All management reports will be submitted at the precise frequency outlined in the Report Catalog. A report package will be presented at the necessary intervals without exception.**
- Performance Reports will not take precedence over Leadership Data Integrity Monitoring Reports. Both are critical to the decision making process!**
- The executive may not gather and report the data himself. An executive's job is to make decisions and manage the business and manage change. Therefore, someone should be assigned the sole responsibility for gathering and formatting the data. Preferably, much of this data should be gathered and manipulated through the computer system wherever possible.**
- We have discovered that most companies with integrated information systems can develop most Performance Reports and Leadership Data Integrity Monitoring Reports automatically, every night, with little human interaction. Many computer systems provide automatic performance of job streams at off hours. The computer simply turns itself on, manipulates the data and prints out the reports. The report is then distributed to the executive or called for on-line by the executive.**



Today's business leaders should not tolerate untimely and inaccurate data, especially if data gathering is routinely performed by the computer.

We believe that most systems implementations unfortunately progress backwards. We like to suggest that leaders implement the Performance and Leadership Data Integrity Monitoring Report structure **prior** to implementing **any** computerized operations and control system. By doing this, management will be able to not only manage the business (and data) but also track the improvement in operations as systems are implemented. Certainly, it is a worthwhile endeavor to measure the benefits of a major information systems implementation project. Without routine data gathering, this is simply not possible and has never been done properly.

**Exhibit 12**  
**Sample Leadership Data Integrity Monitoring Report**



The Leadership Data Integrity Monitoring Reports, like the Performance Reports are essential to good business decisions. Executives may not review the daily User's Missing Data Reports or the daily User's Cyclic Data Review work sheets, but must occasionally take a "snapshot" of the data to assure its accuracy.

If the snapshot is above pre-defined limits, the executive makes a phone call to the responsible manager and resolves the problem before it creates more problems! If the snapshot depicts non-perfect conditions that are within acceptable tolerances, then the executive does nothing. However, executives must not become complacent during continued periods of acceptable data performance.

Inaccurate data can be created by every organization within a company at any time. Data is very susceptible to becoming uncontrollable in a short period of time... a condition the modern leader must never permit to occur.

### **Exhibit 13** **Sample of an Innovative Leadership Data Integrity Monitoring Report**

Dear Frank,

I, your friendly computer system, which you spent over \$14.5 million implementing over a period of two years, have completed a review of the **Item Master File**. Specifically, I was looking for missing Item Master data elements which are the responsibility of your **Purchasing Department**.

I am **sad** to inform you that the Item Master file is missing 202 data elements which are the responsibility of your Purchasing Department. What makes this disturbing is that you previously established a limit of no more than 20 Purchasing records missing data elements at any point in time. I think you should be concerned, not only at the magnitude of errors I am reporting to you, but at the fact that your Purchasing organization apparently believes a violation of your directive by a factor of 10 is no big deal! Common sense suggests that if you allow this kind of ignoring of an executive goal to go unnoticed, you will seriously damage your leadership credibility... and have terrible data to boot!

I strongly suggest you contact your Purchasing Manager, Ted Muckenhouse at extension 2121 and work with him to resolve this issue. To assist you, I have done some additional analysis. When discussing your concerns with Ted, you should mention that he has:

- 91 Item Master records missing 202 data elements, or 2.22 data elements per impacted record.
- 73 of the 202 missing Item Master data elements are lead time.
- 61 of the 202 missing Item Master data elements are lot size.
- 45 of the 202 missing Item Master data elements are safety stock.
- 23 of the 202 missing Item Master data elements are standard purchase price.

Let me provide you with some words that will assist you when explaining why these data elements **MUST** be complete and accurate. Feel free to paraphrase my words when discussing these issues with Ted.

#### **Missing Lead Time**

When lead times are missing, your scheduling system assumes instantaneous supply, which of course is not possible. Shortages of needed parts will occur and other matching parts will obviously be early. Thus inventory will increase at the same time shipments are going down. This causes a decrease in factory utilization which drives up our incremental fixed costs. This leads to a margin squeeze which forces us to lose cash profits which we desperately need to fund our R&D efforts. We can only make up this cash shortfall by raising our prices, which causes us to lose orders which leads to a further decrease in utilization... thus continuing the downward spiral. In the end, we have less cash, more unhappy customers, more obsolete inventory and higher costs. All of our stock and stock options will suffer.

#### **Missing Lot Size**

When lot size is missing, our information system does not know how to spread the purchasing costs. This results in the computer attaching a purchase cost to each part purchased instead of the lot of parts. Obviously, this increases our perspective of cost and creates a distorted cost picture. In the end, no one will know what our product really costs, which will most likely lead to defective pricing. We will not know which products are making us money and which ones are losing us money. We will be flying blind!

#### **Missing Safety Stock**

When safety stock is missing, we run out before a re-supply can occur. Everything you read about in the Missing Lead time section can be repeated.

#### **Missing Standard Purchase Price**

Without a standard purchase price, our cost rollup process will ignore the material cost. Since material is generally 50% or more of our product cost, we will cost our product with a 50% or greater error. If we rely on this data for pricing strategy, we will undoubtedly end up selling our product below our cost. This robs cash from the business, destroys earnings, increases our risk and annihilates our investor's confidence in us. In the end, we can expect this lack of confidence and cash generation capabilities to destroy your and my stock value.

I hope I have expressed the seriousness of this matter. It is not just missing data. We have a situation that if unchecked, can seriously damage our company. I strongly suggest that you contact Ted at your earliest convenience to discuss these very important issues.

Have a nice day . . . . . *Your Ever Friendly Computer.*

A sample of a Leadership Data Integrity Monitoring Report is depicted in Exhibit 12. This report makes it easy for leaders to review the completeness and accuracy of a master data file without viewing each day's detail.

It is possible to get creative in the development of Leadership Data Integrity Monitoring Reports. One creative approach developed by one of our clients is particularly noteworthy. The report (see sample in Exhibit 13) was developed by a client who insisted on the computer generating a memo describing the quality of data in a particular environment. Each month, on the 16th, the computer would print a series of "*Data Monitoring Memos.*" The memo's described not only the quality of the data, but also provides the executive with the rationale behind the need for quality data in this environment. The executive can simply call the employee and explain the rationale and the pervasive effects of bad data, all of which was presented and explained in the memo.

In a sense, the memo provided a "*speech*" which the executive could read over the telephone to the responsible employee, explaining what data was inaccurate and why it was an important issue. Executives gain a new sense of credibility when they are able to explain to employees how they are specifically affecting the company's value and employees enjoy executives who really know what they are talking about.

**Executives must be instructed how to interpret numbers, not comparative pictures. Use graphs and charts only where precision is not necessary to the decision making process. We believe that departmental budgeting, sales performance analysis, inventory valuations, etc., are not properly represented by graphics (except in summary presentations). Leaders must understand the numbers and the source of the numbers!**

Though I originally believed this executive monitoring memo was a bit hokey, I have come to a great appreciation for its purpose. It helps the executives see where the data problems are, helps them to solve the problem and provides the tools for explaining the pervasive effects of missing or inaccurate data to the culprits. Thus, it wraps an SPC tool around a leadership tool... something that has been dramatically missing from the management toolbox for years.

A word of caution regarding Leadership Data Monitoring Reports is necessary here:

**While graphs, bar charts, pie charts and other graphic representations of data are useful, they can be over utilized. A leader's role is to understand the meaning behind the numbers, not that one bar is bigger than another bar or that a pie slice has increased slightly this quarter. The purpose of reporting data integrity and performance is to identify exact conditions at exact times for the purpose of making more precise decisions. Graphic representations often do not fit this requirement and therefore should be used with caution.**

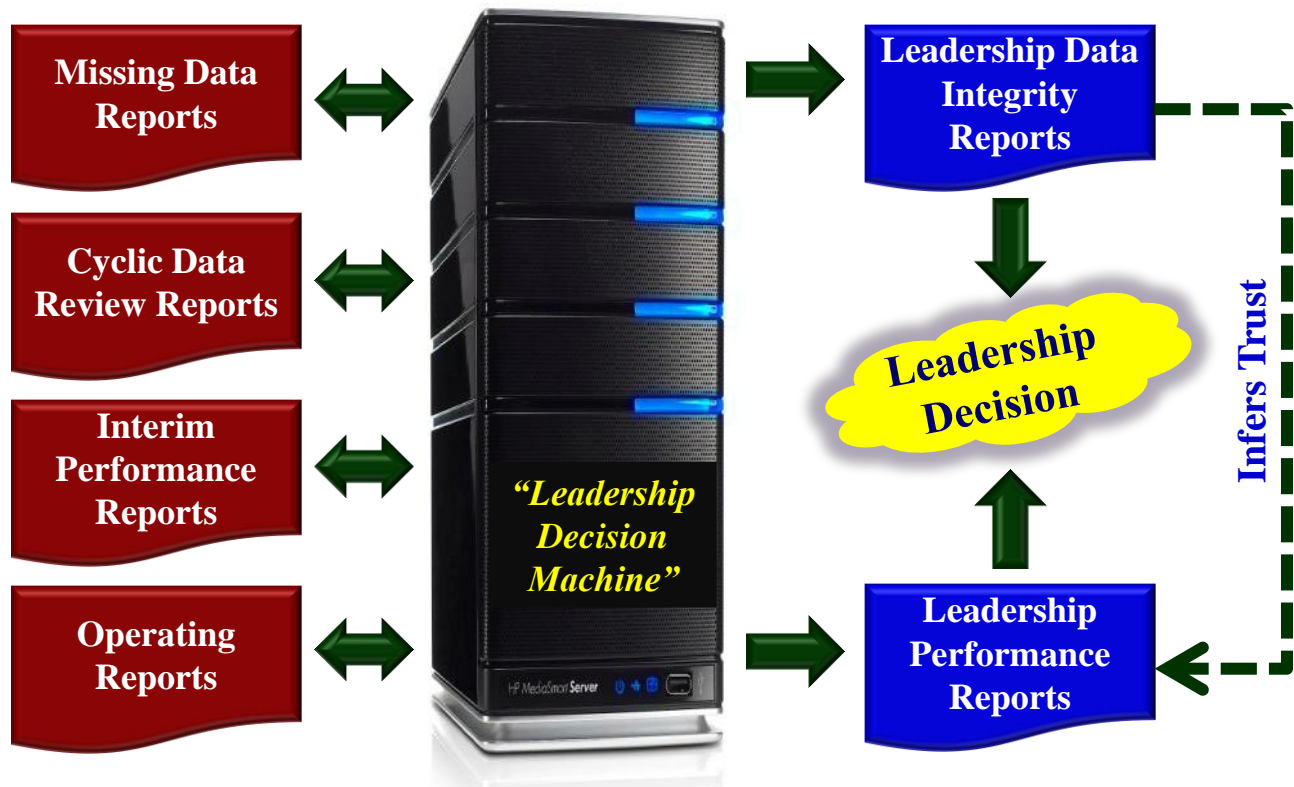
## **The Final Step... Making Decisions in the Computerized Company**

According to Dr. Peter Drucker, well-known management consultant and author, the first responsibility of leadership is economic performance. I take this one step further by insisting that a leader's responsibility is profit and long-term growth.

We must recognize that long-term growth cannot exist without short-term profits. Yet if improperly managed, a company can develop great short-term profits while destroying the company's future. This has often occurred because leaders did not truly understand the implications of their short-term decisions. They did not have accurate data nor did they have the ability to routinely simulate impacts of different decisions on the business.

Irrespective of the computerized decision model utilized, the detail input data really controls the integrity of the output. I have personally known many executives who attempt to use simulation models for identifying the impacts of different decisions while at the same time putting little emphasis into the detail input data utilized by the model. In final form, this always generates multiple solutions that cannot be trusted!

**Exhibit 14**  
**Data Management and the Decision Making Process in a Computerized Environment**



Stacked side-by-side on the leader's desk, Performance Reports and Leadership Data Integrity Monitoring Reports work together to give the executive detailed insights into the guts of the business. It is the Leadership Data Integrity Monitoring Reports that "infer" a level of trust into the Performance Reports. Indications of grossly inaccurate data will probably mean untrustworthy performance predictions.

I have identified in this briefing a number of methods to improve data integrity and develop trust in data. Once this is accomplished, the question then becomes, "How do leaders use good data to make good decisions?"

Without sounding arrogant, the answer to this question is really simple. Provided with timely Management Performance and Leadership Data Integrity Monitoring Reports, an executive must review the data in detail, discuss it a little and make the necessary decisions. Putting this another way, once leaders have their trustworthy reports, they must lock themselves away for five to ten hours per month, put their feet on their desks and pour over the numbers. It is critical that leaders pour over the numbers, pondering each number as if additional profit and growth could be squeezed from the business by a slight tweaking of the numbers.

It is true that companies can be run by the numbers. The numbers are a common denominator that ties different functions with different goals and with different personalities together into one common decision making machine. However, leaders cannot review only the Performance Reports. They must review and understand the Leadership Data Integrity Monitoring Reports with equal fervor if the Performance Reports are to be meaningful. Exhibit 14 depicts how these two types of reports work together to improve decision making.

## Summary... Assuring Trust in Data

Gone are the days when leaders can make decisions without considering the condition of the supporting data. Today's aggressive leader must consider the integrity of the data which the decision will be based upon. Ignoring this fact will place the probability of good decision making in the lap of the lowest caliber individual in the firm.

Leaders must not abdicate their responsibility to monitor economic performance. Additionally, the modern leader must not abdicate his or her responsibility to continually monitor the condition of data used in the information system.

An outline of an eight step process to implement this new leadership responsibility is presented in Exhibit 15.

Remember, sound data practically assures an increased probability of sound decision making. Complete, accurate and timely data will free leaders to do what leaders are paid to do... manage the business!

Isn't it about time we start running our businesses instead of letting our businesses run us?

### Exhibit 15 Implementing Data Integrity Reports... A Step-by-Step Approach

- 1. Identify master files that are critical to the systems environment.**
- 2. Develop a *Plain English Data Dictionary* defining all elements of each master file and departments (and/or individuals) responsible for element maintenance.**
- 3. Develop *User's Missing Data Reports* and implement. Be sure to put them in the computer's automatic job stream.**
- 4. Develop *User's Cyclic Data Review Reports* and implement. Be sure to put them in the computer's automatic job stream.**
- 5. Develop *Leadership Data Integrity Summary Reports* for data monitoring and implement.**
- 6. Develop a *Leadership Report Package* (catalog) of all performance and data monitoring reports.**
- 7. Assign necessary staff (lean but aggressive) to gather, analyze and assemble the report package on a recurring basis.**
- 8. Train, implement and follow-up.**

## About the Author



Alan G. Dunn is currently President of GDI Consulting & Training Company and founder of the Manufacturing Executive Institute (MEI). He is also the creator and lead-instructor of the 18-month Next Generation Global Supply Chain Leadership Development Program at the California Institute of Technology's (Caltech) Center for Technology & Management Education (CTME), where he has taught since 1984. Mr. Dunn also serves on the University of California at Riverside's (UCR) Advisory Board for Transformative Leadership in Disruptive Times.

Mr. Dunn specializes in supply chain management, strategic planning, manufacturing management, operations management, leadership development, cost management and business finance.

Previously, Mr. Dunn was a Vice President at Gemini Management Consulting and a Partner at Coopers & Lybrand. In both positions, he led large technical manufacturing teams through innovative productivity enhancement projects. Mr. Dunn has participated in >188 significant manufacturing and distribution projects inside >118 companies. He has worked in 24 countries and across most manufacturing sectors.

Over his 40-year career in global supply chain consulting, Mr. Dunn has served on the Boards of Directors of numerous public, private and non-profit companies. He is the recipient of the National Association of Corporate Directors (NACD) prestigious "*Director of the Year*" award in 2007.

Alan is a career Association of Supply Chain Management (ASCM) volunteer, having served as the President of the Orange County Chapter in 1984 and Chairman of ASCM in 2015. He was inducted into the "*ASCM New England Supply Chain Conference Hall of Fame*" in 2022.

Mr. Dunn has a degree in business management from California State University, Fullerton.

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