

Innovative Technology =



*Customer Success*

# Dallas IIA Six Sigma Application: Tools for Auditors

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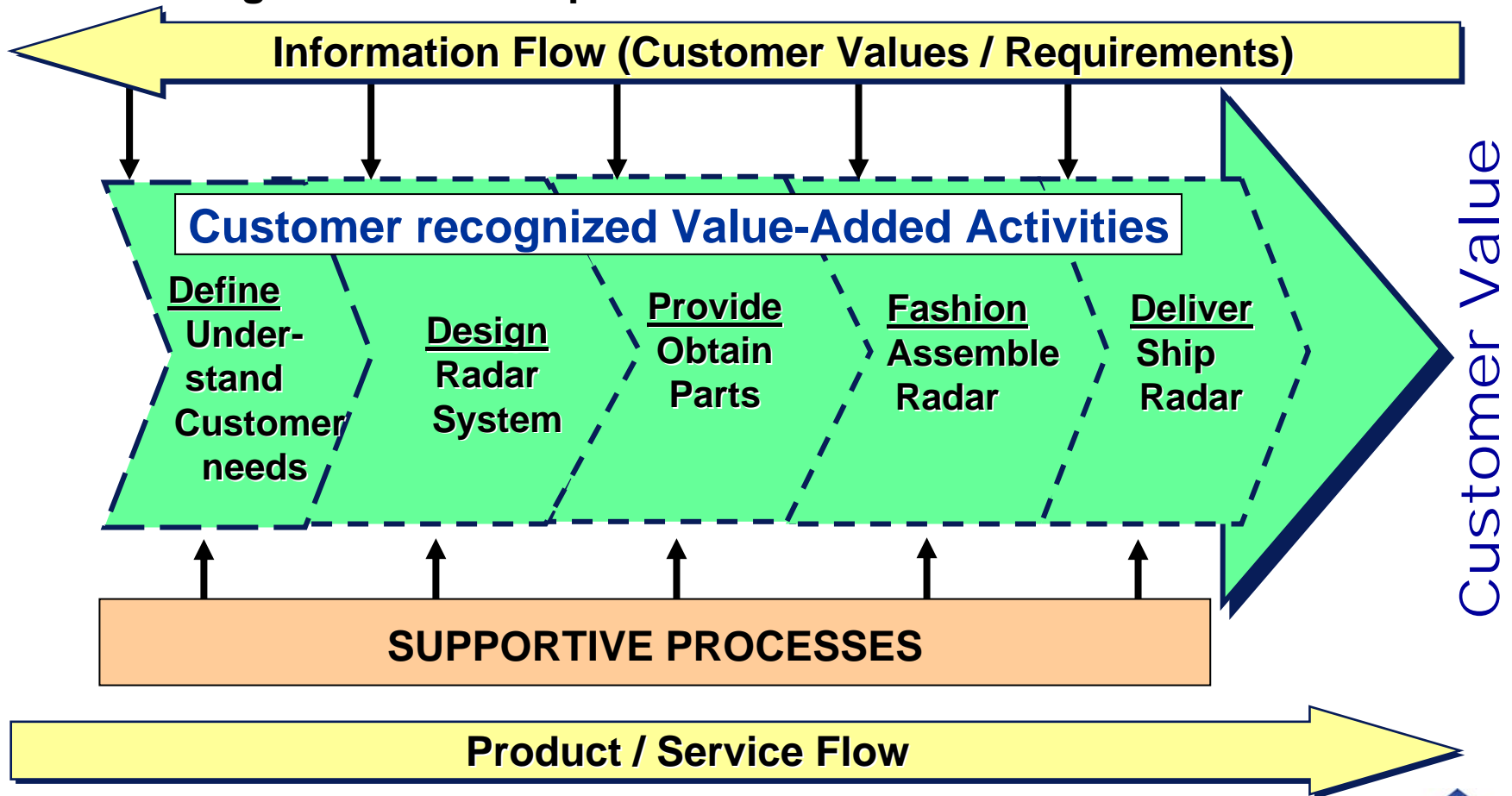
# Raytheon Six Sigma™ Summary



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# Value Stream Defined

The value stream is a set of all the actions required to bring a product or service through the business processes into the hands of the customer



# Value Stream Defined

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- Customer = external, paying Customer
- Value (usefulness, worth, utility) is translatable into something that Customers will gladly pay money for:

Products & Features

Response Time

Service Attributes

Price Point

Quality Levels

Integrity and Commitment

Delivery Rate

Reputation

Convenience



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**Value is ultimately determined by the external,  
paying Customer**

# Value Added Terms Defined

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## Value Added Activity

An activity that transforms or shapes (for the 1st time) material or information to meet customer requirements.

## Non-Value Added Activity (Waste)

Those activities that take time or resources, but do not add to the customer requirements (goal = eliminate these!)

## Non-Value Added Planned Waste

Those activities that do not add to the customer requirements, but must be done for the business to operate (goal = reduce these too!)





# Seven Sources of Waste\*

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- Correction
- Overproduction
- Material movement
- Motion
- Waiting
- Inventory
- Processing



\* from Tacchi Ohno



# Waste (Product Development)

- **Correction** – miscommunication, drawing errors
- **Over Production** – designing but not making, never gets to launch, no standardization, designing in features that customers don't want
- **Material Movement** – data hand-off
- **Motion** – unnecessary analysis, testing, people involved, coordination of meetings, etc.
- **Waiting** – for other elements/functions/disciplines
- **Inventory** – design data not organized/not fully utilized
- **Processing** – redesign/unfocused activities; poorly run team meetings



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# Waste (Administration)

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- **Correction** – incorrect data entry
- **Over Production** – preparing reports, not acted upon/multiple copies
- **Material movement** – extra steps in the process; distance traveled
- **Motion** – steps/data entry
- **Waiting** – processing monthly, not as the work comes in (closings)
- **Inventory** – transactions not processed
- **Processing** – signoffs, reports, etc.



# The Value Add Analysis Tool

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## Value Add Analysis Benefits:

- ✓ Enables identification of waste and planned waste for elimination and further diagnostics
- ✓ Leans processes
- ✓ Facilitates knowledge sharing/transfer among process owners and stakeholders



# The Value Add Analysis Tool

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## Value Add Analysis Benefits:

- ✓ Prioritizes improvement opportunities
- ✓ Saves your company actual \$\$\$!
- ✓ Improves your external customer's satisfaction
- ✓ Can enable generation of revenue



# The Value Add Analysis Tool

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## Approach

- Review existing process maps or create new ones.
  
- Identify defined process to assess. You will need:
  - Clear beginning and ending points
  - Know all stakeholders for process
  - Understand materials, machinery, etc involved or have stakeholder with knowledge
  
- Validate and “level set” process owners based on existing process maps. Gain baseline agreement for discussion.
  - This is key. Avoid assessing multiple or related processes at one time.



# The Value Add Analysis Tool

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## Approach Continued...

- Conduct **facilitated** discussion with process owners
  - Set Ground Rules
  - Map the steps in the process as if “you were the object”
  
- Document process step description and responsibility
  
- Identify the elapsed time since the prior step (i.e. step one will have a zero elapsed time from prior step)
  
- Identify the actual time each step takes to complete in a common unit of measure (usually minutes)

# The Value Add Analysis Tool

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## Approach Continued...

- Identify the amount of “dead time” associated with the step
  
- Through discussion with stakeholders determine whether the step is value added or not
  - Done right the first time
  - Transforms or shapes the product or service to be delivered
  - Adds value to the external customer
  
- Determine whether non-value added activities are pure waste or planned waste

# The Value Add Analysis Tool

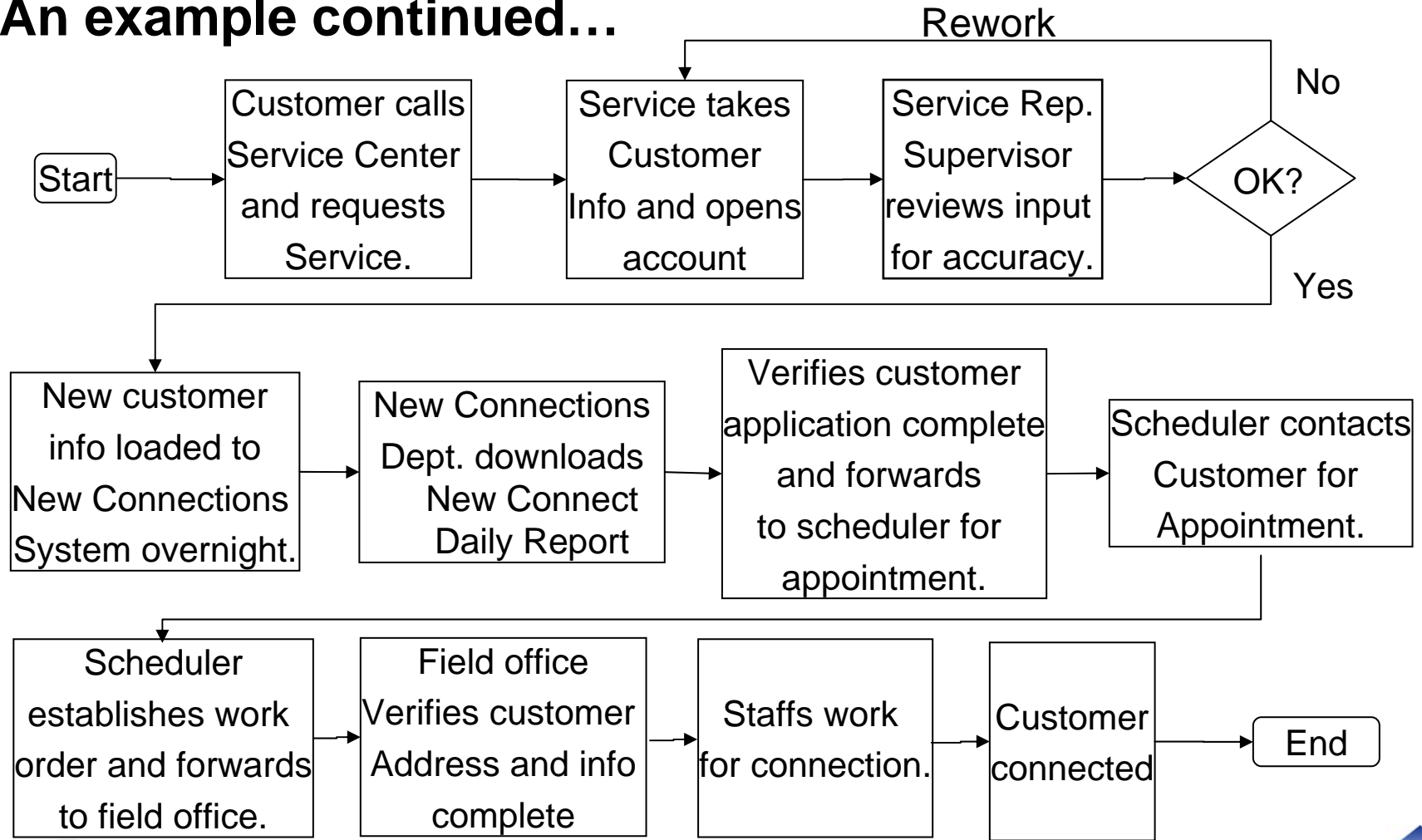
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## An example...

- Utility Business
  - New customer connections
  
- Map the steps in connecting a new customer's electric power

# The Value Add Analysis Tool

## An example continued...





# The Value Add Analysis Tool

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## An example continued...

Document the steps in the process:

- Description
- Responsibility
- Elapsed time
- Actual time
- Dead time
- Whether the step is value added or not

# The Value Add Analysis Tool

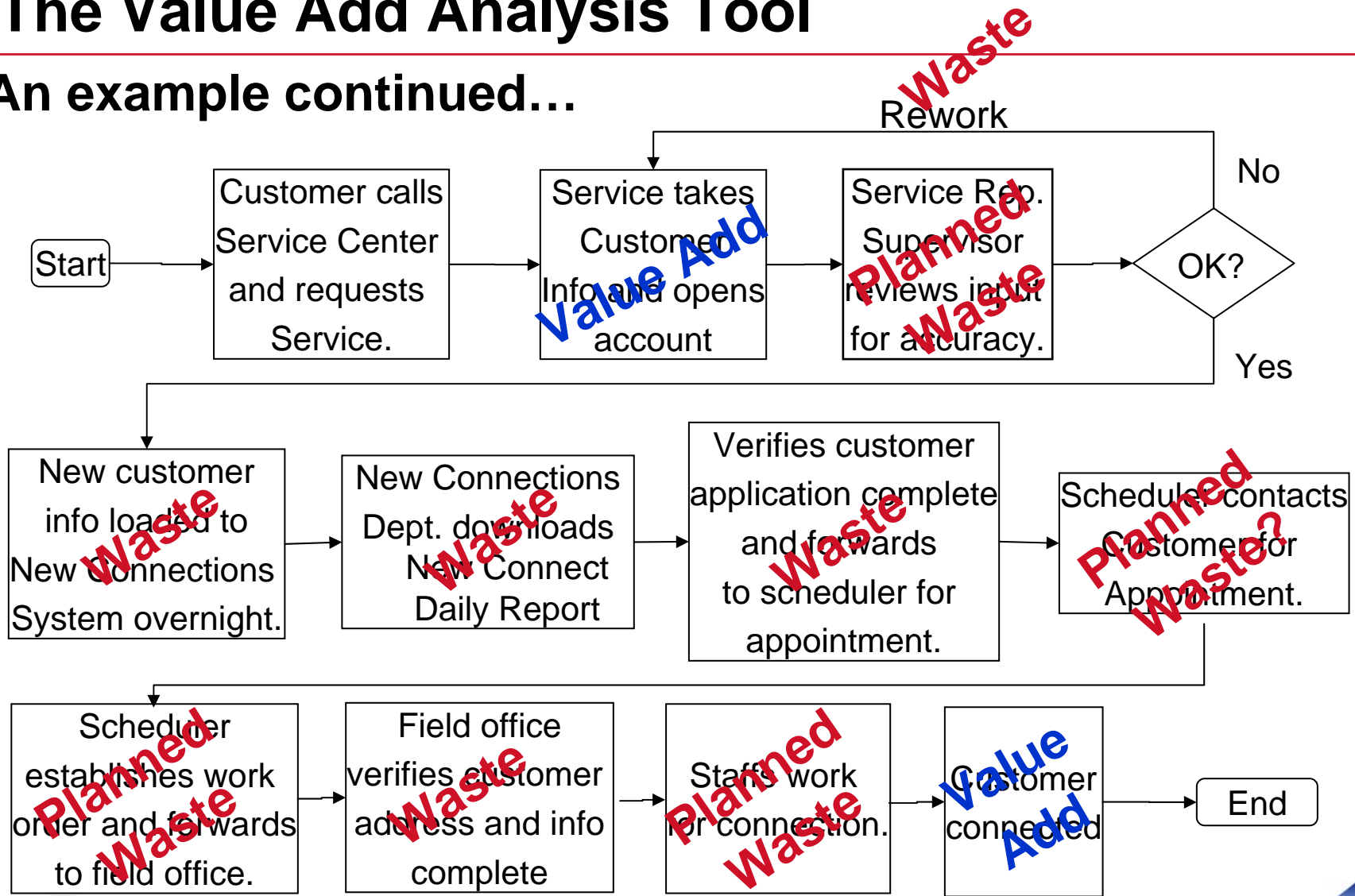
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## An example continued...

- Lets assume the process map is complete, accurate, and detailed enough and that elapsed time, duration time, and dead time are already known....
  - Which steps in the process are value added and which are waste or planned waste?

# The Value Add Analysis Tool

An example continued...



# The Value Add Analysis Tool

An example continued...

Step	Description	Responsible Person	Elapsed Time	Actual Time (minutes)	Dead Time	Value Add	Non-Value Add
1	Customer calls Service Center and requests service.	Customer, Call Center	0	0	0	0	0
2	Service takes Customer info and opens account	Call Center Rep	0	20	1	20	0
3	Service Rep.Supervisor reviews input for accuracy.	Supervisor	21	20	40	0	20
4	Rework	Call Center Rep	60	90	40	0	90
5	New customer info loaded to New Connections System overnight.	Supervisor	130	30	480	0	30
6	New Connections Dept. downloads New Connect Daily Report	New Connects	510	30	60	0	30
7	Verifies customer application complete and forwards to scheduler for appointment.	New Connects	90	60	60	0	60



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# The Value Add Analysis Tool

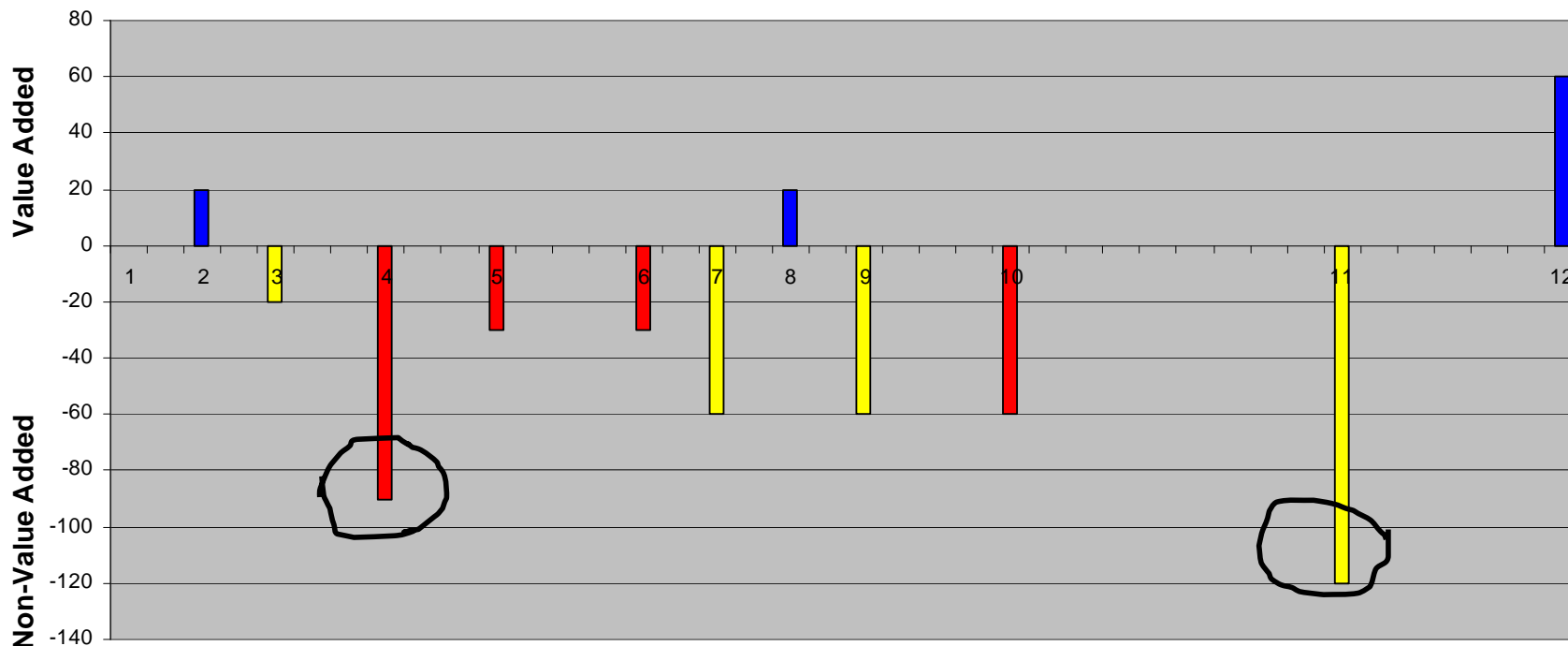
## An example continued...

Step	Description	Responsible Person	Elapsed Time	Actual Time (minutes)	Dead Time	Value Add	Non-Value Add
8	Scheduler contacts Customer for Appointment.	Scheduler	120	20	20	20	0
9	Scheduler establishes work order and forwards to field office.	Scheduler	40	60	120	0	60
10	Field office verifies customer address and info complete	Field Office	180	60	2880	0	60
11	Staffs work for connection.	Field Office	2940	120	1440	0	120
12	Customer connected	Field Office	1560	60	120	60	0
	Total				5261	100	470

# The Value Add Analysis Tool

An example continued...

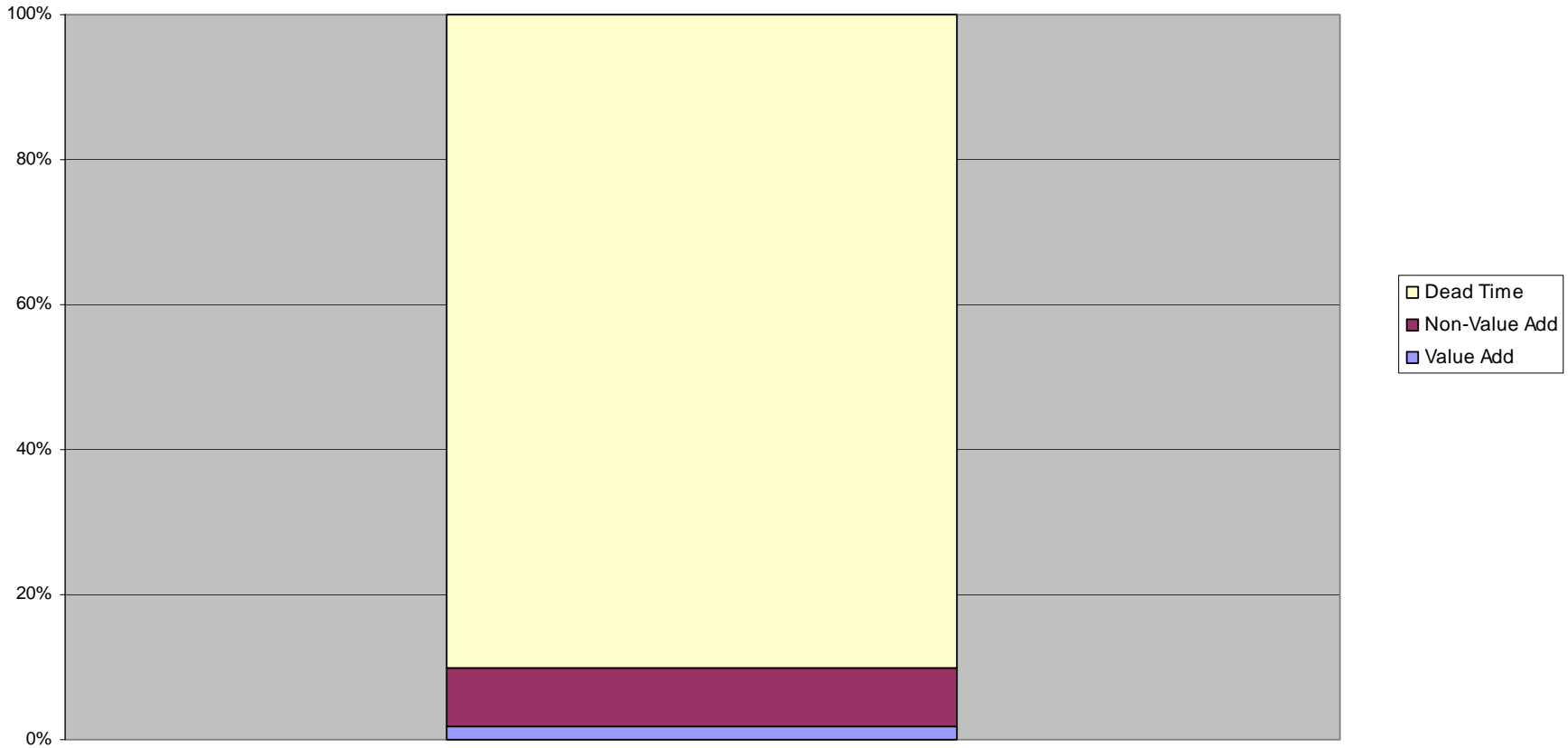
New Customer Connections  
Value Add Analysis Results



# The Value Add Analysis Tool

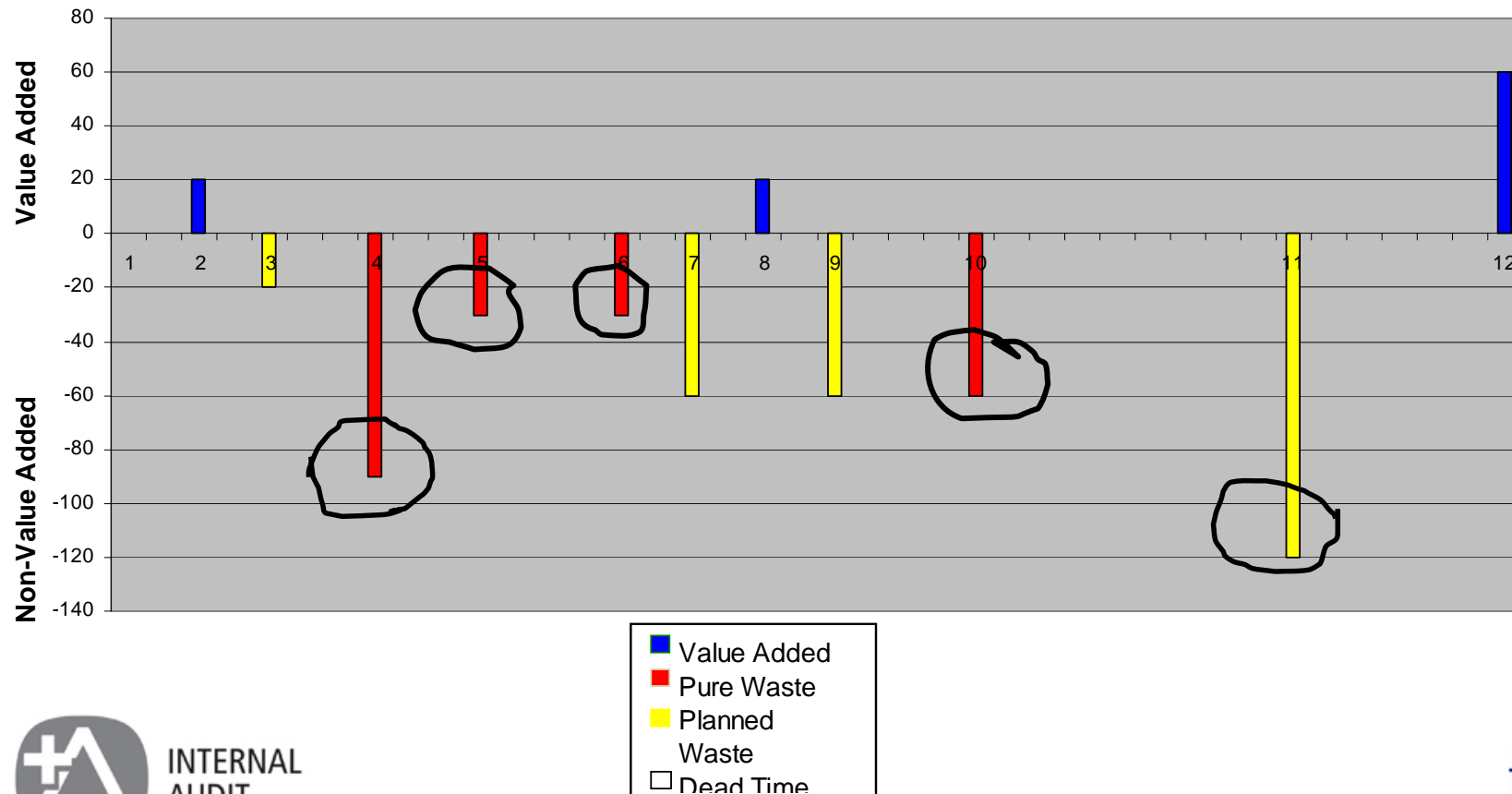
## An example continued...

Time Value Bar Chart  
New Customer Connections



# The Value Add Analysis Tool

- Given the data collected from the Value Add Analysis, which major steps would you prioritize for further diagnostics/analysis?



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# The Value Add Analysis Tool

## An example continued...

- Conduct post session debrief to prioritize for improvement
  
- Further analysis options:
  - Step #4 “Rework”
    - 130 minutes total time dedicated to rework. What are the root causes and conditions associated with the rework?
    - 20% reduction in time associated with rework could save \$\$\$  
26 minutes x \$100/hr = \$43 X multiple connections!
  
  - Step #11 “Staff for connection job”

# Additional tools to support further analysis

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- Spaghetti Charts
- Apollo Root Cause Analysis
- Failure Mode Effect Analysis

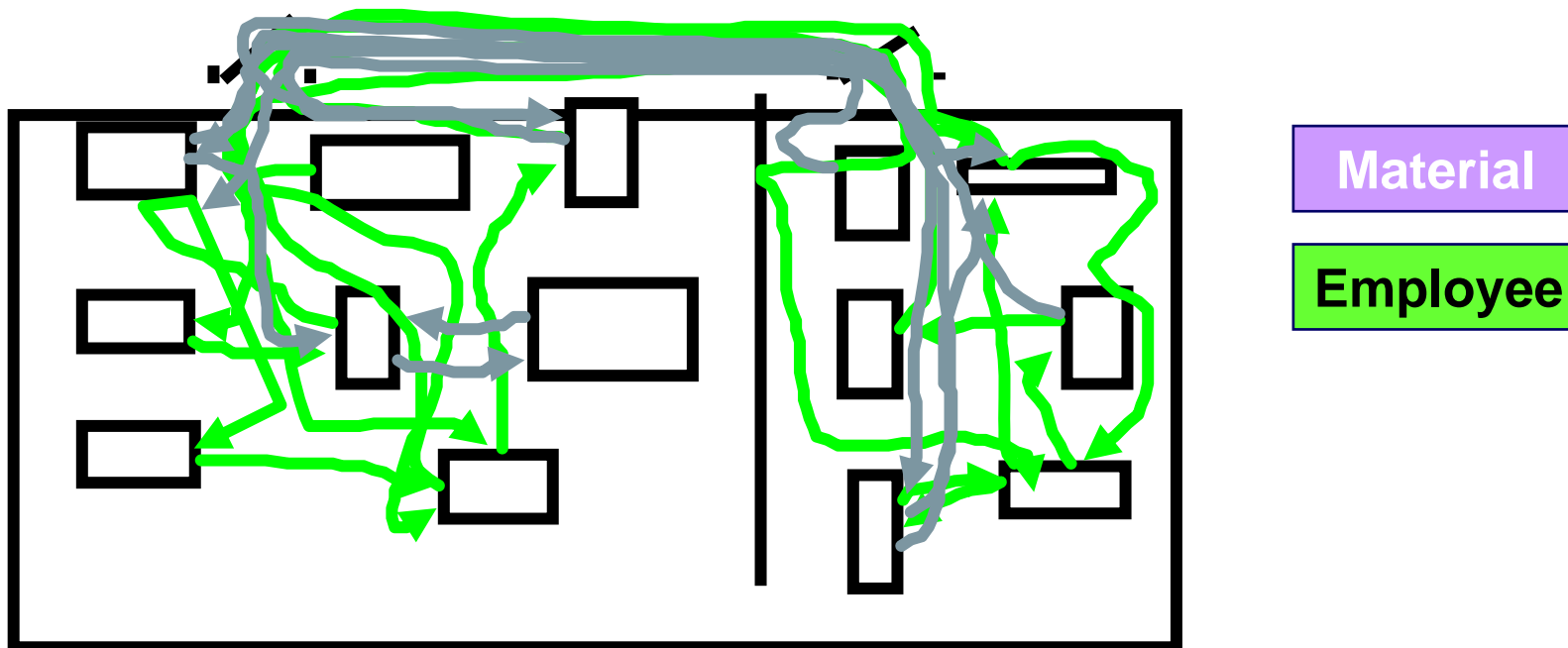


# Additional tools to support further analysis

## ▪ Spaghetti Charts

Capture the physical flow/travel of a process by measuring or calculating the distance traveled for:

- People
- Information
- Product / material
- Rework



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# Additional tools to support further analysis

## ▪ Apollo Root Cause Analysis

- Focus on interrelationships between causes and effects to identify opportunities for effective solutions
- Alignment around the problem and the significance
- Incorporates key cause and effect principles
- Use of evidence to validate causes
- Thoroughness of investigation is driven by time and knowledge available
- Effectiveness of solutions dependent on degree of acceptable risk



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**Focus on finding solutions...not fixing blame**



# Additional tools to support further analysis

## ▪ Failure Mode and Effects Analysis (FMEA)

- A systematic technique to identify potential failures and understand the impact the failure may have on the new process
- Will help mitigate risk and further improve the product or process improvement
- FMEA is used to identify the following:
  - What can go wrong?
  - What is the effect if this would occur?
  - What is the plan to control or prevent its occurrence?



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**Analyze the potential failure modes of the improved process.**



# Q&A



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