

Evaluating Economic Development Investments

Council for Community and Economic Research

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Nexus Associates is an economics and management consulting firm based in the United States.

- **We specialize in planning, performance measurement, program evaluation and economic analysis.**
- **Clients include government agencies, multilateral organizations, not-for-profit institutions, and private companies.**
- **In this capacity, we have undertaken projects for organizations such as:**
 - **Ben Franklin Technology Partnership**
 - **Connecticut Innovations**
 - **Industrial Labor Organization**
 - **Inter-American Development Bank**
 - **International Finance Corporation**
 - **Government of Malaysia**
 - **Government of Mexico**
 - **Massachusetts Renewable Energy Trust Fund**
 - **Massachusetts Technology Collaborative**
 - **NIST Manufacturing Extension Partnership**
 - **Oklahoma Alliance**
 - **Pennsylvania Industrial Resource Centers**
 - **World Bank**



Workshop agenda

Subjects	Exercises
Introduction	
Purposes of evaluation	
Introduction to program logic models	
Identifying elements of program logic models	Exercise 1
Building a program logic model	Exercise 2
Principles of measurements	
Defining appropriate indicators	Exercise 3
Methods for estimating impacts	



Purposes of evaluation



Government and other stakeholders want to know whether programs have been implemented as envisioned and have produced the results that were anticipated.

- **Governments are constantly under pressure to allocate scarce resources to competing needs.**
- **Information on actual results is critical to program management and budget deliberations.**
- **Decisions with respect to ongoing operations and/or continued funding should be based on accurate and credible information.**
- **In this regard, evaluations need be well-designed and implemented according to good standards of practice.**



Although evaluations can be designed to address numerous lines of inquiry, these can be summarized in the form of four basic questions:

- **Was the original rationale for the program sound?**
- **Have services actually been provided to the target population?**
- **Are resources being used in an efficient manner?**
- **Has the initiative been effective in achieving intended outcomes?**
- **Are impacts likely to be sustained?**



Performance should be assessed across multiple dimensions.



Introduction to program logic models

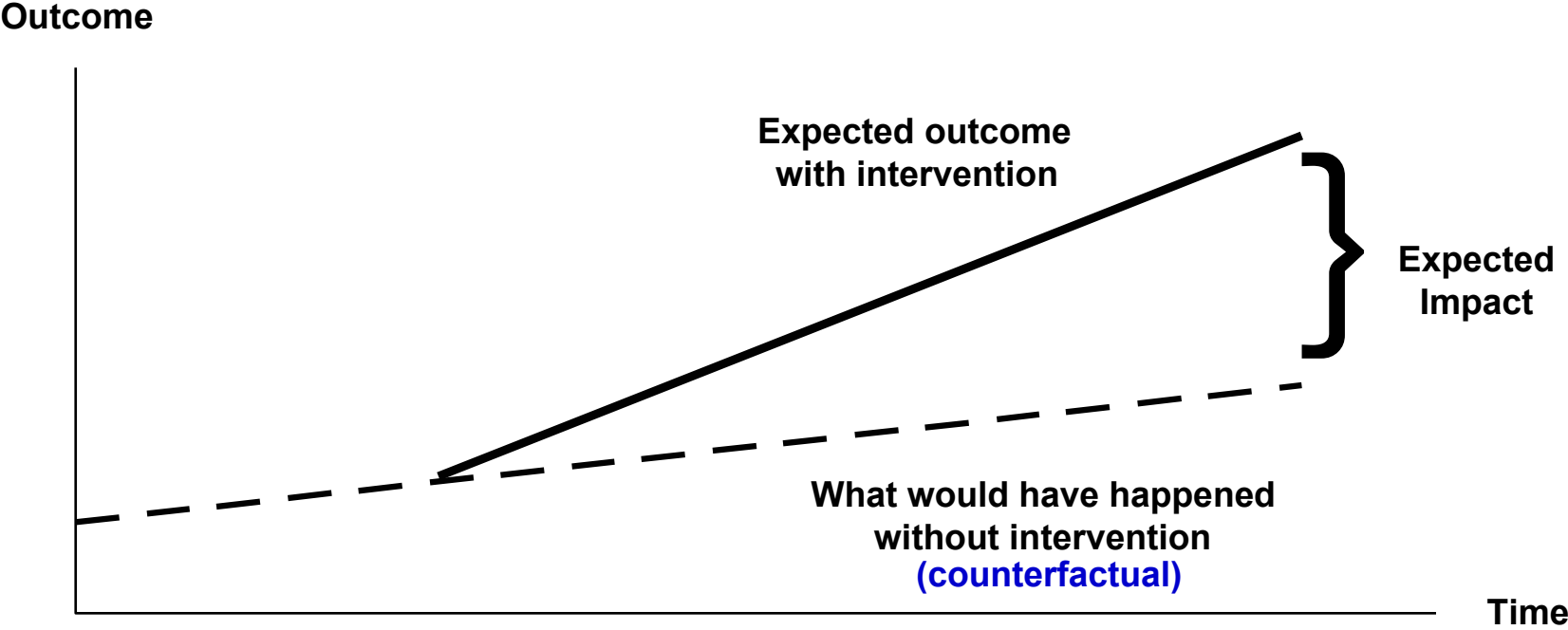


Economic development programs are intended to address social and economic issues.

- **The justification for public intervention arises from market failures.**
 - Markets may result in an underinvestment in physical and human capital from a societal perspective due to imperfect information, externalities, limited competition, initial distribution of assets, and the public nature of some goods.
 - In addition, while markets may allocate resources efficiently, the resulting outcome may not be equitable.
- **Economic development organizations are charged with the task of enhancing the lives of people in the state.**
 - Boost productivity and economic output
 - Raise incomes
 - Ensure environmental sustainability



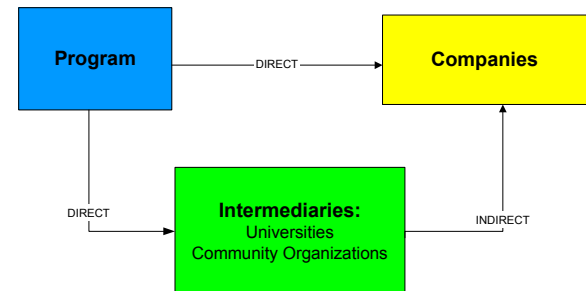
The critical assumption underlying *all* economic development programs is that conditions will improve as a *direct result* of the program.



Economic development programs may target organizations, companies and/or individuals.

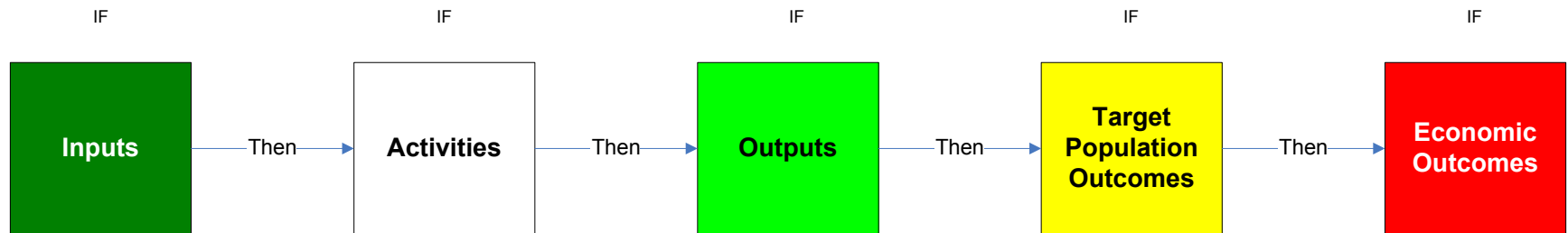
- **Targets can be defined by certain characteristics such as location, income, or sector.**
 - The target of a grant program may be universities with accredited engineering departments
 - The target of a regional investment fund may be start-up companies in selected technology-based industries
 - The target of a technical assistance program may be manufacturers with less than 500 employees

- **The target population can be defined in terms of the *direct* and *indirect* beneficiaries of programs offered by the implementing organization.**
 - Programs may provide assistance *directly* to universities to enhance their performance...
... with the further intention of improving the performance of firms *indirectly*.



Program logic models explain how programs are expected to lead to the attainment of social and economic goals.

- All programs are based on explicit or implicit assumptions about the nature of the problem and the intervention needed to address it.
- Program logic models provide concise descriptions of how programs will improve social and economic conditions within target populations.
- They provide a clear and logical argument demonstrating how program activities will produce intended outcomes, noting important causal mechanisms.
- The major concept in program logic models is cause and effect (If X, then Y).



- Numerous variations of the underlying concepts and techniques exist under different names – “chain of reasoning,” “theory of action,” and “performance framework.”



Illustrating *how* programs will solve problems has several benefits.

- **Helps identify elements of programs that are critical to success;**
- **Helps build a common understanding of the program and expectations among stakeholders based on a common language;**
- **Provides a solid foundation for developing indicators and conducting evaluations.**
 - Program logic models are used to identify the critical elements of programs that should be measured.
 - An ability to describe the causal mechanisms or paths leading from program activities to observed outcomes is essential in asserting causality.
 - Without a theory of causation, it is difficult to explain *why* outcomes were produced or why outcomes were *not* produced – programs remain a “black box”.
- **Poorly specified models limit the ability to identify and subsequently measure intervening variables on which outcomes depend.**
- **Organizations such as the World Bank are using PLMs as a tool for program design, indicator development, and program evaluation.**



Program logic models are composed of five basic elements.

Element	Definition
Inputs	Resources used to perform activities
Activities	Tasks performed using resources and methods
Outputs	Products produced directly as a result of program activities
Outcomes (Target Population)	Changes in knowledge, behavior (new practices) and performance within direct and indirect beneficiaries
Outcomes (Economic)	Changes in conditions in the broader economy



Exercise 1: Keystone Innovation Zone Starter Kits

Target Population

Who are the direct beneficiaries? Who are the indirect beneficiaries?

The program is directed to academic medical centers and KIZ-participating universities for recruitment of top faculty researchers. Knowledge gained through research is expected to be transferred to businesses in the State, resulting in economic gains and other public benefits.

Problem Statement

What is the problem faced by members of the target population? Why is this important from a social and/or economic perspective?

The State needs to attract top faculty to expand research programs and advance scientific discovery and the commercialization of new technologies. The State will not be able to remain competitive without the infusion of top research talent.

What are the root causes of this problem, i.e., the underlying reasons for the problem, which if eliminated, would reduce its prevalence or severity?

Research institutions find it difficult to recruit top-level faculty in targeted technology areas.

Program

KIZ Starter Kits will provide funding to recruit top research faculty to Pennsylvania.

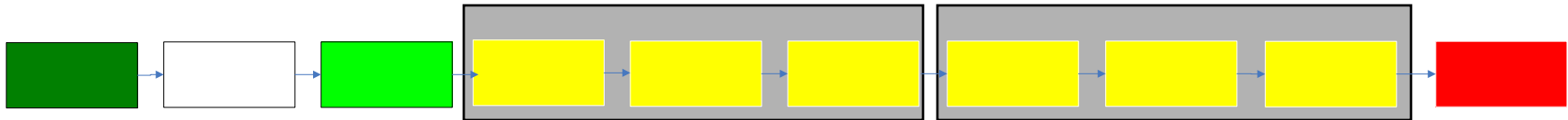


Keystone Innovation Zone Starter Kits

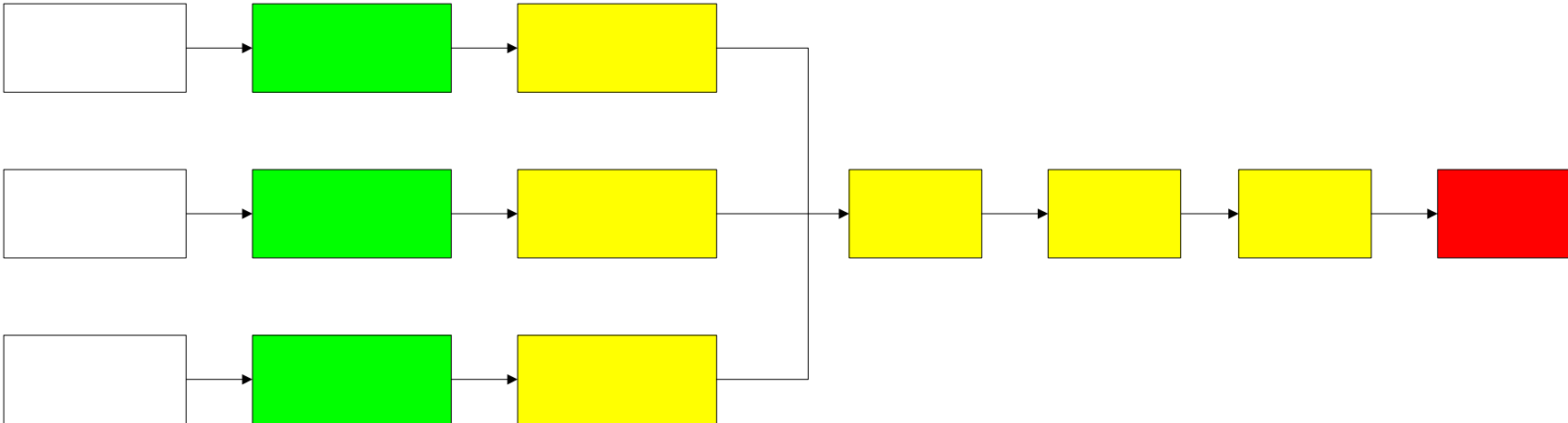
Item	Response
Starter Kits provided	1 2 3 4 5
State funding	1 2 3 4 5
Higher employment in Pennsylvania	1 2 3 4 5
Expanded R&D in targeted areas	1 2 3 4 5
Increased sales	1 2 3 4 5
Patented IP	1 2 3 4 5
Higher profitability	1 2 3 4 5
Higher GSP in Pennsylvania	1 2 3 4 5
Review proposals	1 2 3 4 5
License IP to commercial companies n Pennsylvania	1 2 3 4 5
New top-level research faculty recruited	1 2 3 4 5
Provide Starter Kits	1 2 3 4 5

Key: 1 = input
 2 = activity
 3 = output
 4 = Firm-level outcome
 5 = Economic outcome

Programs may have a long sequence of cause and effect relationships.



Different programs may have the same intended outcomes.



How complex does the PLM need to be and how far down the path should it go?

- **Program logic models are meant to illustrate the most important programmatic elements.**
 - Major elements along the critical path should be included.
 - It is essential to include those elements of the program for which program managers will be held accountable.
- **Program models should extend as far as necessary to demonstrate how social and economic conditions will be improved.**
 - It is important to understand the extended logic of the program even though it may not be possible to measure certain outcomes given budget, schedule and other constraints.



Building a program logic model



Typically, program logic models should be developed with program stakeholders.

- It is beneficial to include representatives from various stakeholders in the process, including donors, managers, staff and partner institutions.
- As a starting point, it is useful to review program documents such as needs assessments, feasibility studies, funding proposals, annual reports, operating plans, and meeting minutes.
- This should be followed by a series of interviews with program stakeholders to elicit required information.
- The document review and interviews should focus on developing an understanding of the rationale for the program, principal goals and objectives, target population, program activities, and critical assumptions.
- While the program manager should assume responsibility for developing the logic model, he or she should hold one or more workshops with key stakeholders to ensure that the model represents the program accurately and to promote a common understanding of the program design.



Exercise 2 – Build a logic model for a chosen program.

- **Build logic models as a group exercise.**
 - Divide into groups.
 - Begin by defining the problem and target population as precisely as possible.
 - Define the intended final impacts of the program.
 - Working backwards, identify intermediate outcomes, immediate effects, outputs and activities necessary to achieve the intended final impacts.
 - Examine the model using the PLM checklist.
 - Modify the model as warranted.
- **Each group will be asked to make a 7-10 minute presentation.**
- **The logic model will then be critiqued by other workshop participants.**



Begin by summarizing the problem that the program is intended to address and the specific target population that it aims to serve.

Target Population

Problem Statement

List major program elements

PLM element	
Outcomes – Economic	
Outcomes – Target Population	
Outputs	
Activities	
Inputs	

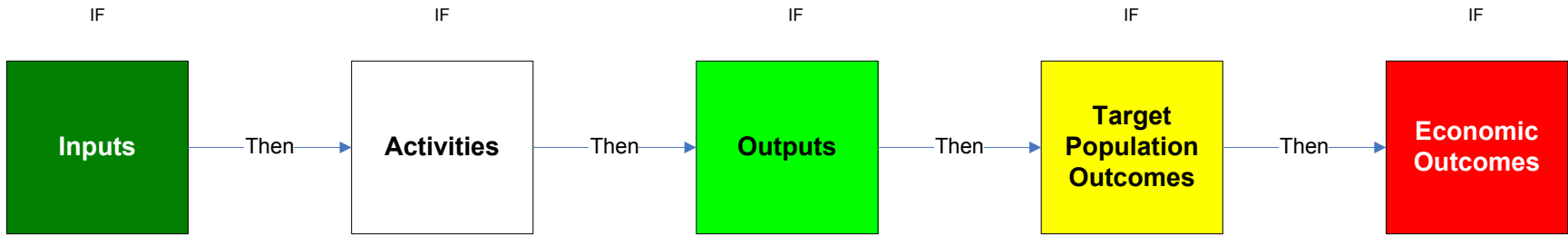
Check the logic

Question	Response
Is the model an accurate depiction of the program?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Are all elements well defined?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Are there any gaps in the logical chain of events?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Are elements necessary <i>and</i> sufficient?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Are relationships plausible and consistent?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is it realistic to assume that the program will result in the attainment of stated goals in a meaningful manner?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Principles of measurement



Measurable indicators are needed for each element of the program logic model for which managers will be held accountable.



The aim is to establish indicators that can be used to assess the performance of economic development programs.

- Stakeholders are interested in developing indicators for economic development programs that reflect stated objectives.
- By providing an objective assessment of performance, indicators can be used for several purposes:
 - Guide program management
 - Facilitate learning
 - Ensure accountability
 - Provide a solid foundation for funding decisions



Indicators should be used to measure results with respect to specific objectives.

- **An indicator is an objective measure of an attribute or characteristic of an entity. In this case the entity could be an individual, organization, or economy.**
- **Indicators are expressed in quantifiable terms such as numeric values, rates, percentages, ratings, scores and indices.**
- **Indicators should reflect major economic development objectives in terms of changes over time, particularly changes that have occurred as a result of specific programs.**
- **To ensure comparability, economic development organizations need to apply common indicators using common definitions and common measurement procedures.**

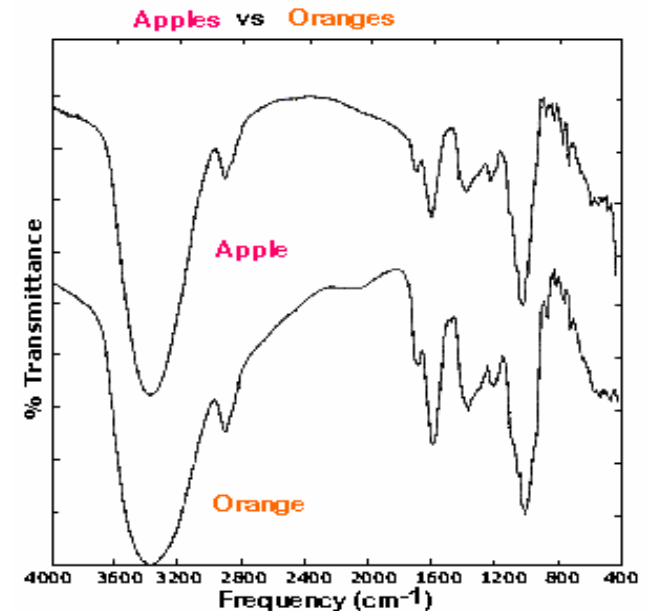


It is possible to compare apples and oranges.



- **In fact, it's relatively straightforward...**
 - Both samples were prepared by gently desiccating them in a convection oven at low temperature over the course of several days.
 - The dried samples were then mixed with potassium bromide and ground in a small ball-bearing mill for two minutes.
 - One hundred milligrams of each of the resulting powders were then pressed into a circular pellet having a diameter of 1 cm and a thickness of approximately 1 mm.
 - Spectra were taken at a resolution of 1 cm⁻¹ using a Nicolet 740 FTIR spectrometer.
- **... as long as you have well-defined indicators and consistent measurement procedures.**

**Infrared Transmission Spectra
Granny Smith Apple and Sunkist Orange**



Source: Scott Sandford, Annals of Improbable Research



There are four basic types of measures that can be used as indicators.

- **Ratio**
 - Distances between values are equal and the scale includes a zero point which signifies the absence of the characteristic being measured.
- **Interval**
 - Distances between adjacent values on the relevant scale are equal with respect to the characteristics being measured.
 - However, the scale does not contain a true zero.
 - Differences can only be expressed in absolute terms.
- **Ordinal**
 - Values are ordered based on a categorical (semantic) scale, e.g., excellent, very good, good, fair and poor.
 - Typically, five to seven levels.
 - Distances between values are indeterminate.
 - Mean and standard deviation are misleading
- **Nominal**
 - Contain names, labels or categories with no natural order.

	Nominal	Ordinal	Interval	Ratio
Mutually exclusive				
Logical ordering				
Equal distance between scale values				
True zero point on scale				
	Technologies Used	Quality on scale of 1-5	Temperature	Annual Sales

The decision to adopt a particular indicator should be based on the degree to which it is relevant, valid, reliable and practical.

Criteria	Definition
Relevance	Measures need to be germane to the particular initiative being studied.
Validity	Measures need to provide an accurate reflection of the underlying concept that is supposed to be measured.
Reliability	Measures should be subject to as little measurement error as possible.
Practicality	It has to be possible to obtain data needed to calculate measures given constraints in time, data availability and budget.

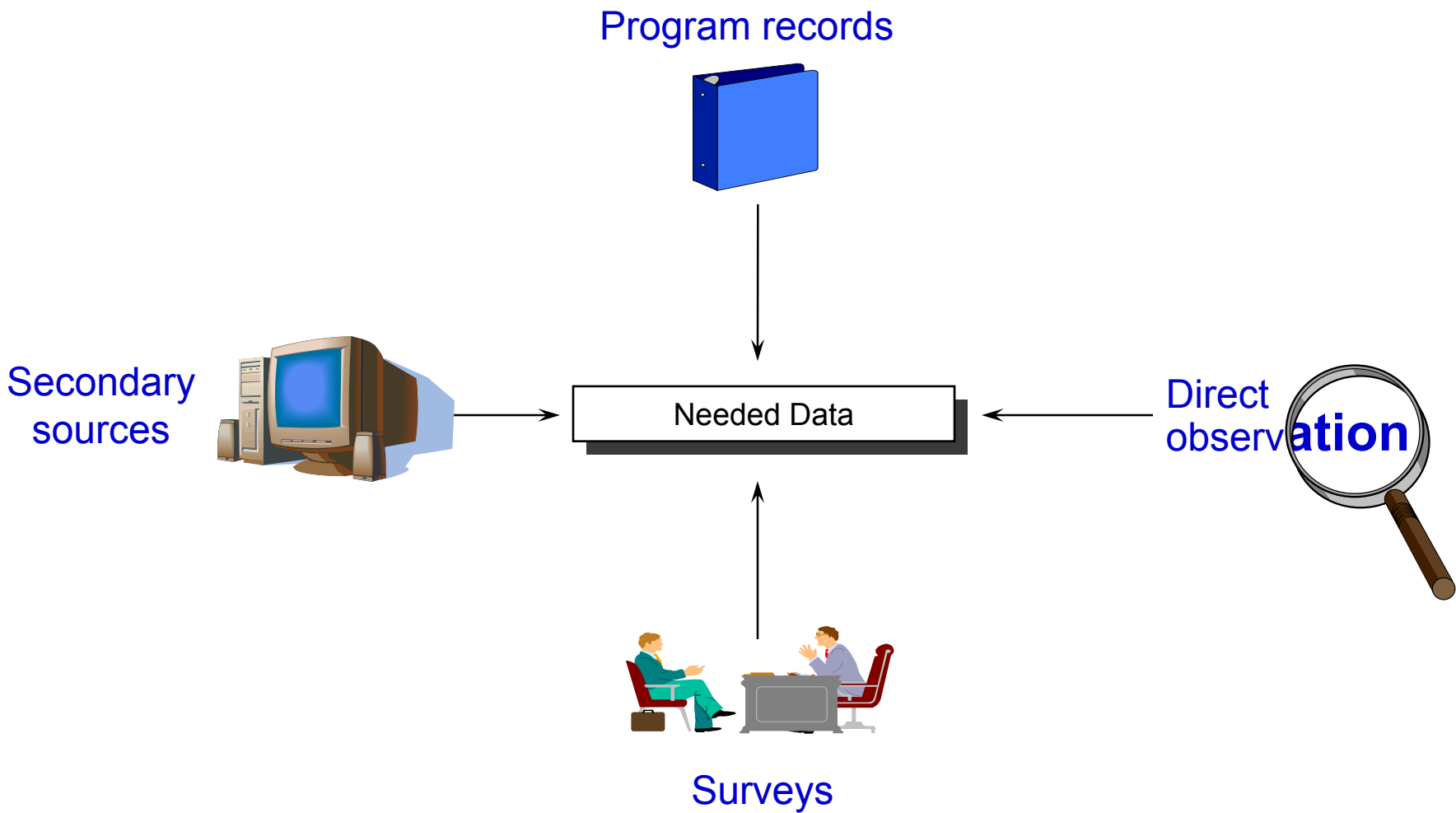


There may be different ways to measure a particular concept.

- **For example, there are four *ratio* measures of productivity:**
 - Sales per employee
 - Value added per employee
 - Value added per labor hour
 - Total factor productivity (TFP)
- **While sales per employee is relatively easy to calculate, it may not be valid in a given situation.**
 - This measure of productivity focuses solely on one factor of production.
 - Observed productivity gains may be the result of greater outsourcing, rather than improvements in the utilization of existing assets.
- **Conversely, TFP focuses on value added in production based on all productive resources (labor, capital and materials). However, necessary data may be unavailable.**



The data needed to calculate specific indicators may come from a variety of sources.



Exercise 3 – Define performance measures for a selected program

- Identify critical constructs related to throughput, efficiency and effectiveness.
- Define indicators for selected concepts.
- Examine the indicators using the performance measure checklist

Construct	Indicator

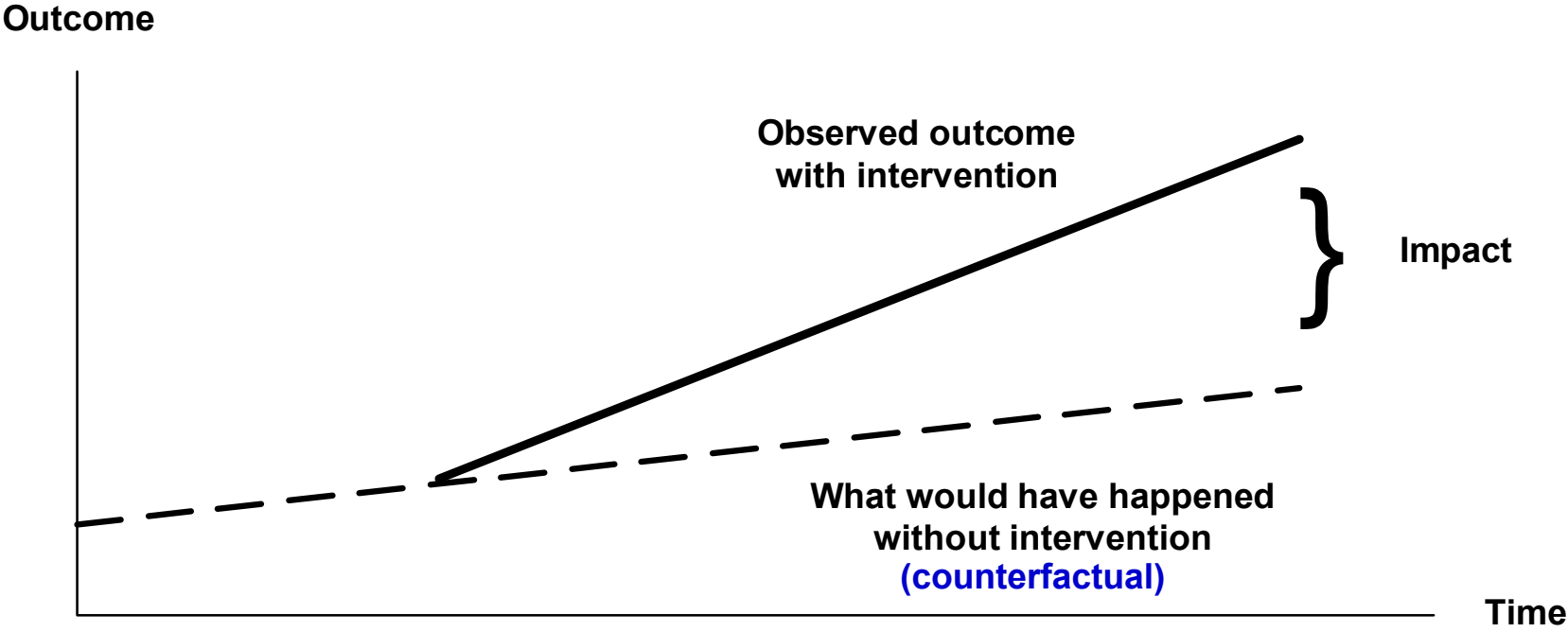
Performance Measure Checklist

Question	Response
Is the indicator relevant to the program, i.e., is the concept to be measured included in the program logic model?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is the indicator a valid measure of the concept?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is the indicator likely to be reliable?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Are data necessary to calculate the indicator likely to be available?	<input type="checkbox"/> Yes <input type="checkbox"/> No

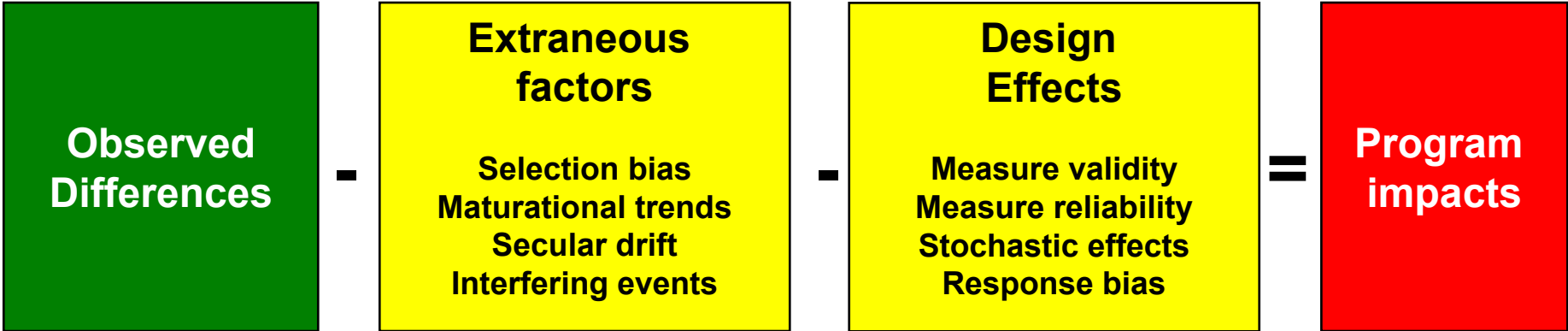
Methods for estimating impacts



The crucial issue in assessing the impact of an economic development program is comparing the observed situation with the counterfactual.



This requires isolating program impacts from other factors that may influence observed differences



There are four quantitative approaches that can be used to estimate program impacts.

- **Experiments with random assignment**
- **Quasi-experiments with constructed controls**
- **Non-experiments with reflexive controls**
- **Participant judgment and expert opinion**



Experiments with random assignment.

- **Companies in the treatment group receive assistance; those in the control group receive an alternative type of assistance or none at all.**
- **Random assignment helps guarantee that the two groups are similar; extraneous factors that influence outcomes are present in both groups.**
- **Because of this comparability, claims that differences between the two groups are the direct result of the program are more difficult to refute.**
- **Experimental designs are used quite frequently to test the efficacy of new treatments in health, social welfare and education.**
- **However, this approach has not been used extensively in evaluating the impact of business assistance programs.**
 - Political considerations make random assignment difficult.
 - The services provided to companies may not be standardized.
 - It is frequently hard to maintain experimental conditions.
 - Experiments tend to be costly and difficult to administer.



Quasi-experiments with constructed controls.

- The performance of participating companies is compared to other similar firms that have not received assistance. However, instead of random assignment, a comparison group is constructed after the fact.
- Valid comparisons require that the two groups be similar with respect to key characteristics, exposure to external events and trends, and propensity for program participation.
- To the extent that the two groups are similar, observed differences can be attributed to the program with a high degree of confidence.
- There are several types of designs that fall within this general category:
 - Regression discontinuity
 - Statistically equated controls
 - Matched controls
 - Generic controls.



Non-experiments with reflexive controls.

- Many programs have been evaluated by comparing the performance of program participants before and after the intervention, attributing *all* of the growth in sales and employment to the program.
- While widespread, results from studies that rely exclusively on reflexive controls should be treated with substantial skepticism.
- The performance of companies is affected by numerous factors, including firm-specific effects, industry trends, and general economic conditions.
- Before-and-after design cannot isolate the impact of the program from these other extraneous factors.



Participant judgment and expert opinion.

- This approach relies on program participants or independent experts to make judgments concerning impacts.
- Individuals are asked to estimate the extent to which performance was enhanced as a direct result of the program – in effect, to compare current performance to what would have happened in the absence of the program.
- While this approach is quite common, it is fraught with problems. It requires people to be able to determine the *net* effect of the intervention based solely on their own knowledge.
- However, it may be the only option available given data and budget constraints.
- When used, care should be taken to make sure that people consider the counterfactual in their assessment of impacts.

