

Clinical Laboratory Technology Management



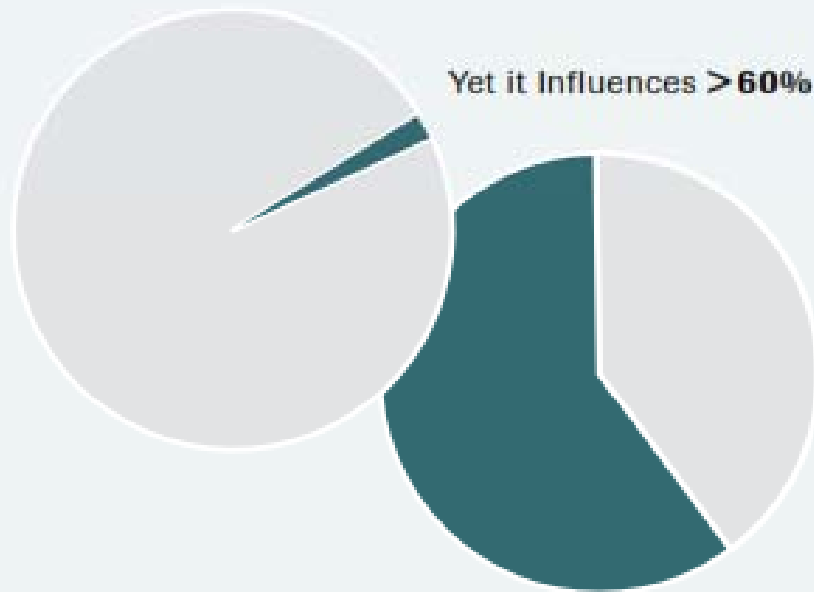
Industry Role

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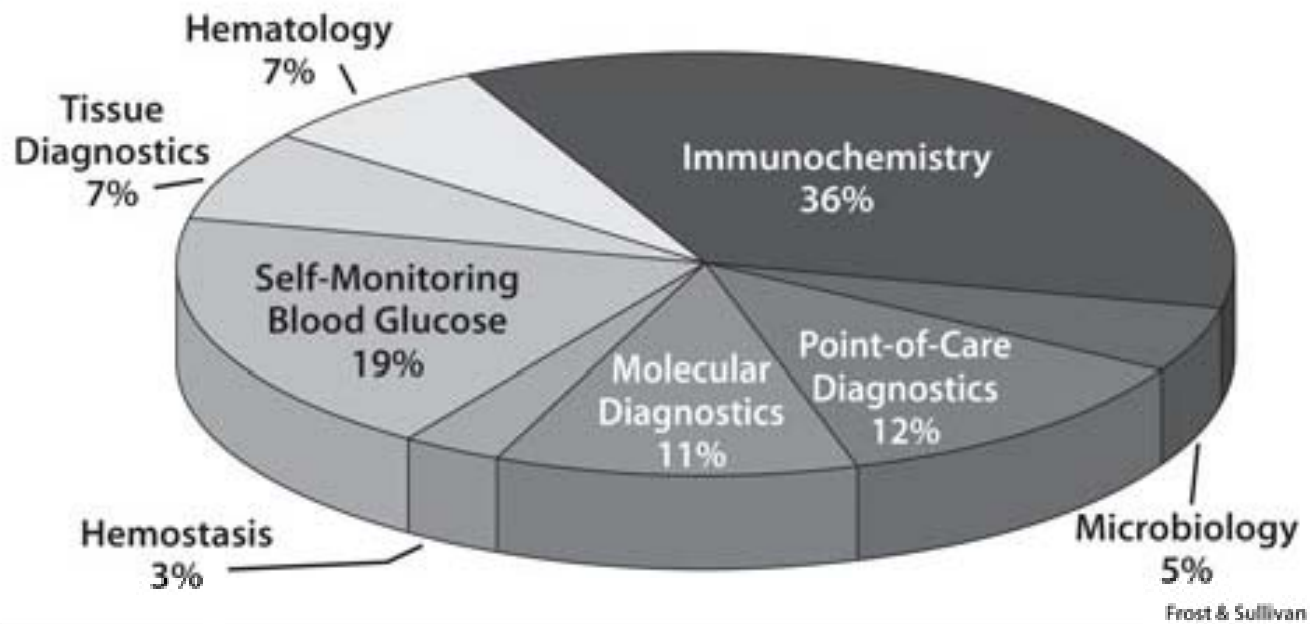
Technology has been rapidly introduced into laboratory medicine and other services during the past two decades. This has not only altered the ability of medicine to diagnose and treat disease but also changed the public's expectations of health care

Technology includes any new procedure, regardless of whether or not instrumentation is involved

IVD accounts for **<2%** of total worldwide healthcare spending



Global In Vitro Diagnostics Market (2012)



Applications of technology in the clinical laboratory:

- (i) performance of a new procedure routinely**
- (ii) Performance of a new procedure in specialty laboratories only**
- (iii) Improved service as a result of decreased turnaround time or some other criterion**
- (iv) Cost reduction in an existing service**
- (v) Simplification of test performance**
- (vi) Increased accuracy or precision of an existing procedure**
- (vii) enhanced management decision making.**

Stakeholders	Needs, Wants & Expectations
Physicians and other Care Givers	Improved clinical outcomes, improved diagnosis and treatment
Patients	Improved patients' experience, improved physiological well-being, reduced waiting time, reduced delay
Organizations	Enhanced efficiency of internal operations, cost containment, increased productivity and quality and outcomes improvement
Innovator Companies	Profitability, improved outcomes
Regulatory Agencies	Reduced risks and improved patient safety

In one place, at one time a technology may be good and other times not appropriate because there is a change in the environment or in the main target

Two different sites with identical equipment will have different capacities to manage the demand for care

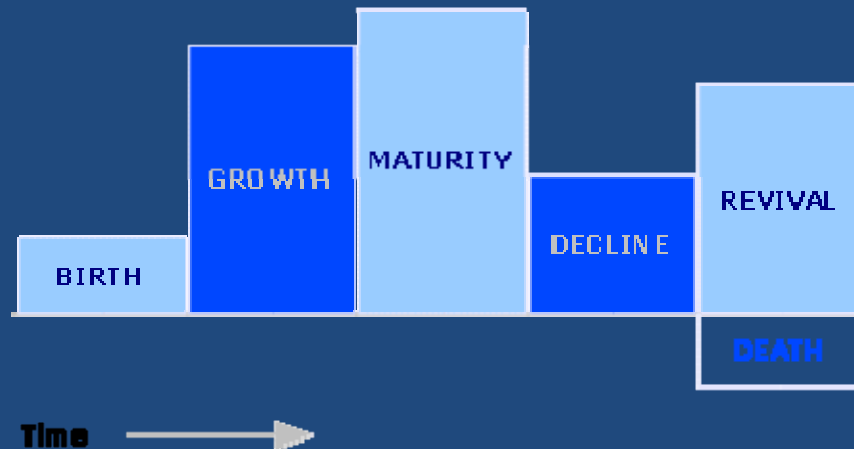
Time and Place

The organizational life cycle is the life cycle of an organization from its creation to its termination.

There are five level/stages in any organization.

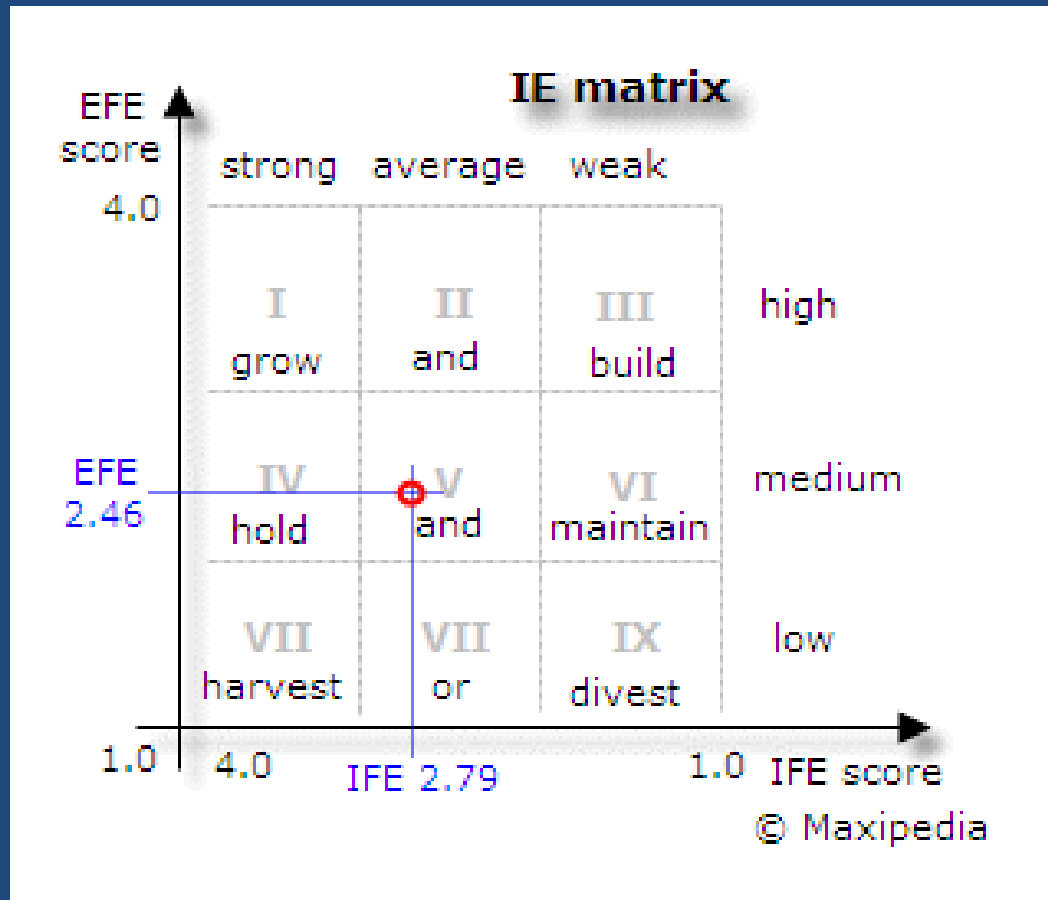
Birth
Growth
Maturity
Decline
Death/Revival

Stages of the Organizational Life-Cycle



Choice of technology is a strategic choice

IE Matrix



Decision to select the appropriate technology

SWOT

Feasibility of Technology

Business conditions and possibilities to improve business operations of a clinical laboratory

Strengths

weaknesses

Opportunities

threats

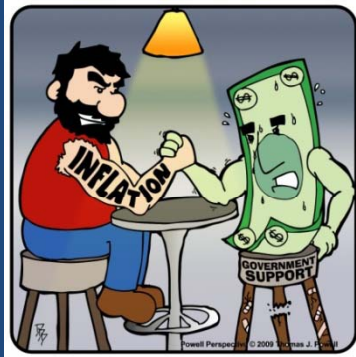


strengths and weaknesses refer to internal characteristics of a clinical laboratory, whereas opportunities and threats are external factors.

Appropriate technologies to reduce the
weaknesses of business

Appropriate technologies to
elimination of threats of business

Appropriate technologies to use of
opportunities of business



Cost Reduction

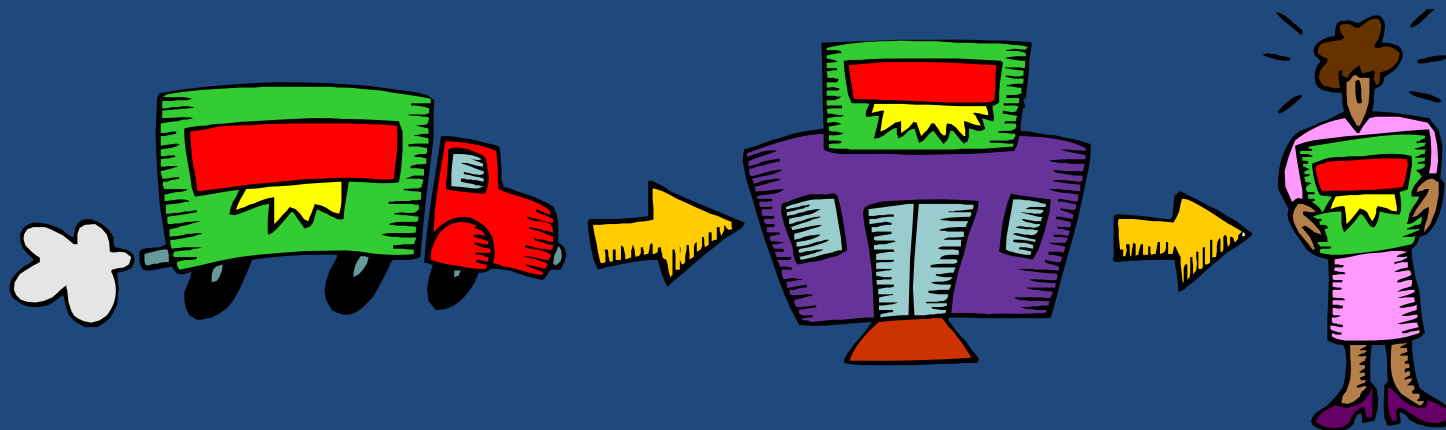


IMPACT OF COST CUTTING ON LABORATORIES

Test cost accounting

In today's increasingly competitive environment, revenues per test are continuing to decrease to survive, laboratories are adapting to this cost-cutting necessity through organizational changes, automation, and staffing economies.

The economic viability of the laboratory is greatly affected by both test volumes and variety. Make/buy decisions require accurate cost data for each test



Reducing Clinical Laboratory Costs Might Affect Accuracy of Test Results



inexperienced or lesser-trained staff are being to perform the most complex tests, as a consequence, that might lessen the quality of results

In some cases to save money, lab management had reduced the use of controls from levels that previously exceeded the minimum requirements

lay off employees

Increased cost

=

increase pressure for higher level of productivity

Operational Productivity

Labor

Automation

Clinical

Workload

Fiscal Productivity

Departmental

Sectional

Inpatient

Outpatient

Automation

Combined Processes into one efficient system that eliminates the risk of errors associated with human performance

Labor intensive task

Specimen labeling/handling/preparation and storage

Reason for the required advances in Automation

Shortage of Trained clinical technicians

Complex testing Protocol

Benefits of Automation

More efficient of personnel

Improved system usability

Decreased operator costs

Fewer laboratory errors

More rapid processing of samples

Faster recording of analytical results

Greater consistency and repeatability
in the acquired information

Technology Management Process



Technology Management Process



Identification شناسایی



Selection انتخاب



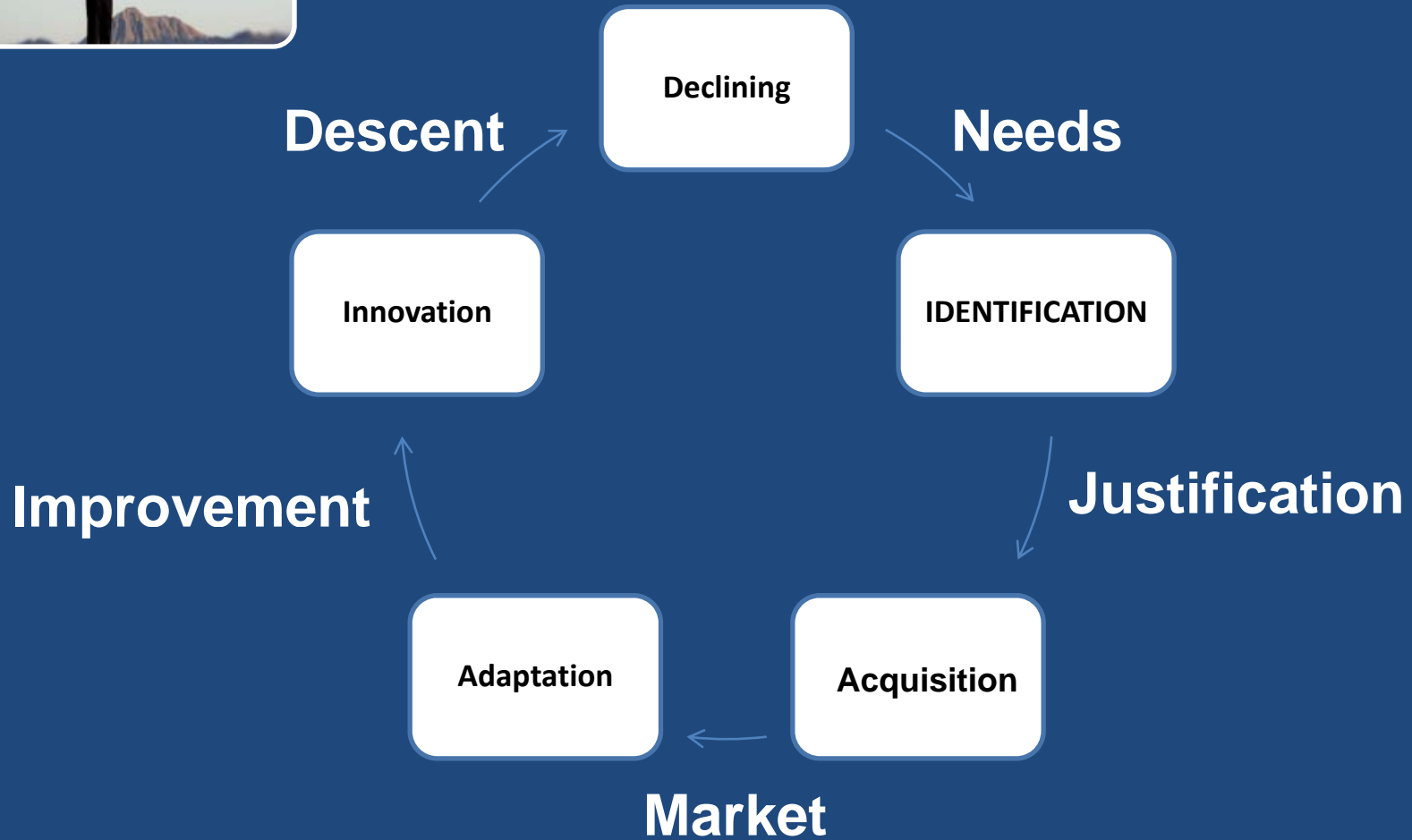
Acquisition کسب

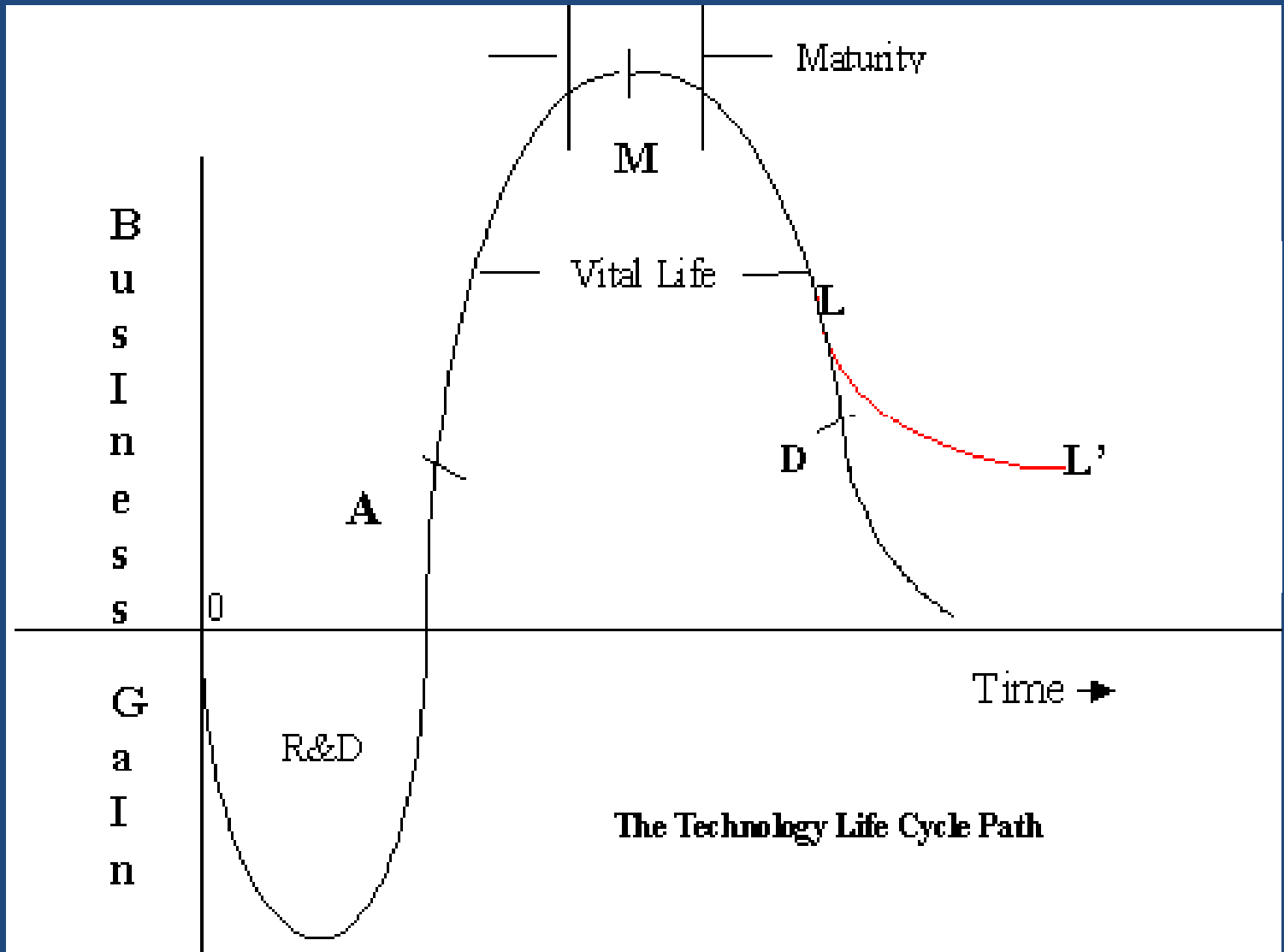


Exploitation بهره برداری



Protection محافظت

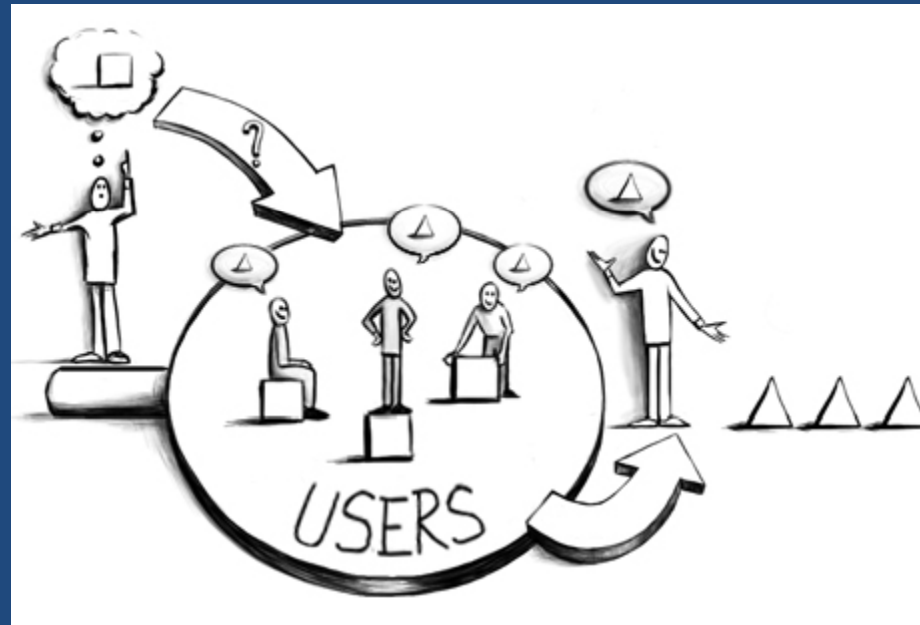




The Technology Life Cycle Path

Understanding the Real Needs

clarifying the various needs and identifying the gaps in the IVD market that create an opportunity for a new product



Product Definition Process in Three Steps



market gap analysis

Market opportunity analysis

Market opportunity analysis

How? Using a market opportunity analysis framework that revolves around four key elements:

Customer

- Analysis of the customer environment uncovers unmet or underserved customer needs, as well as the market they occupy

Technology

- Analysis of the technology environment reveals the readiness of the particular technology, as well as any alternative technologies, on which the manager anticipates deploying the firm's offering

Company

- Analysis of the company environment provides the current state of the company's resources

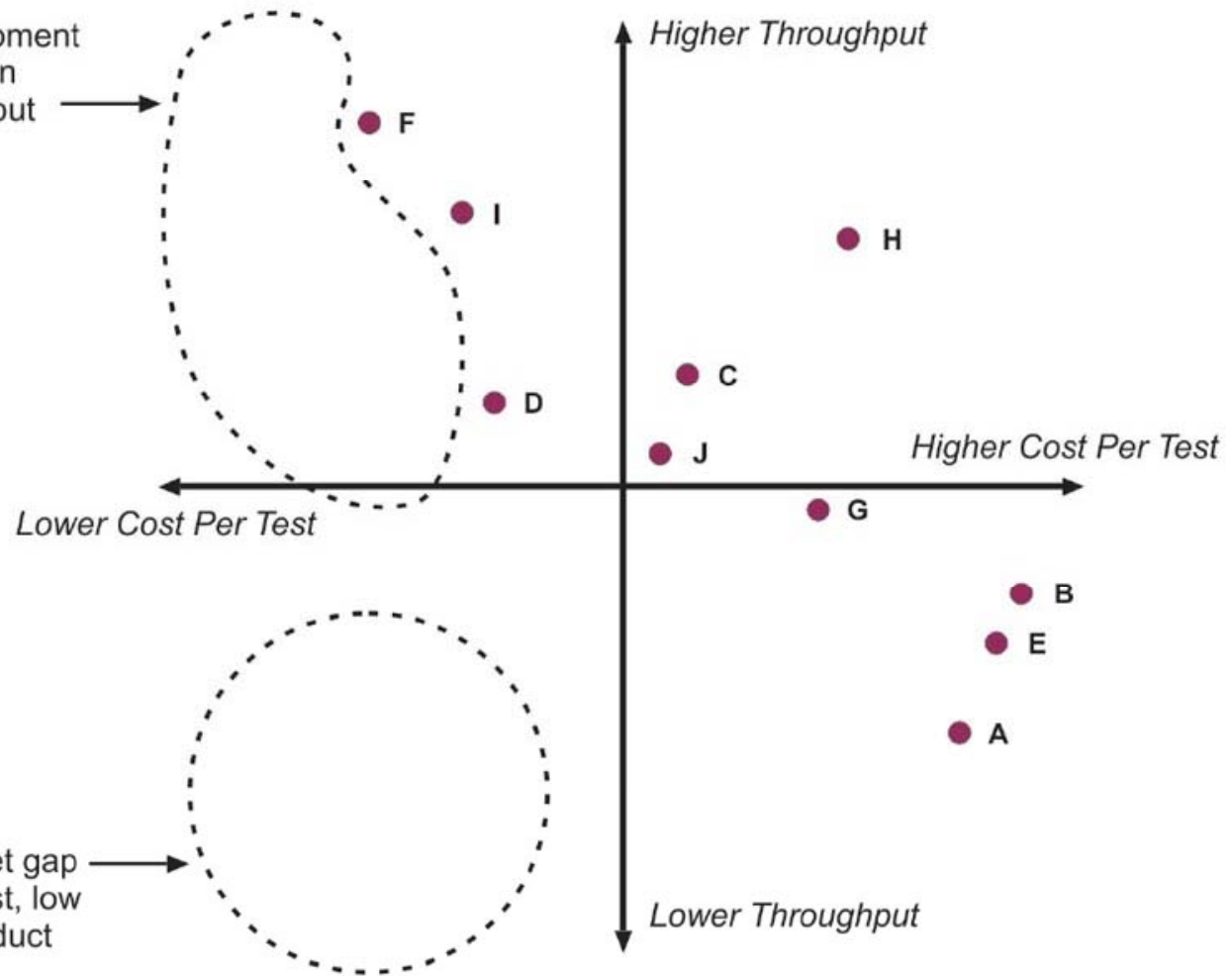
Competition

- Analysis of the competition environment reveal the structure of the industry and market, key competitors in the marketplace, and the firm's relative advantage to each of the key players

Market opportunity analysis



Further development
of cost reduction
and/or throughput
increase



Potential market gap
in low initial cost, low
throughput product

Effects of Gap Analysis

Gap analysis is a tool to help businesses examine current marketing strategies and helps them to improve it.

It may provide information to fresh product or market strategies.

It may give you information about where you stand in the market.

The organization may be proactive rather than reactive.

After identifying the IVD market gaps, various methods such as quality function deployment [QFD] and outcome-driven innovation, others are used to capture and define user needs. Accurately capturing such users' needs is critical to product success

quality function deployment

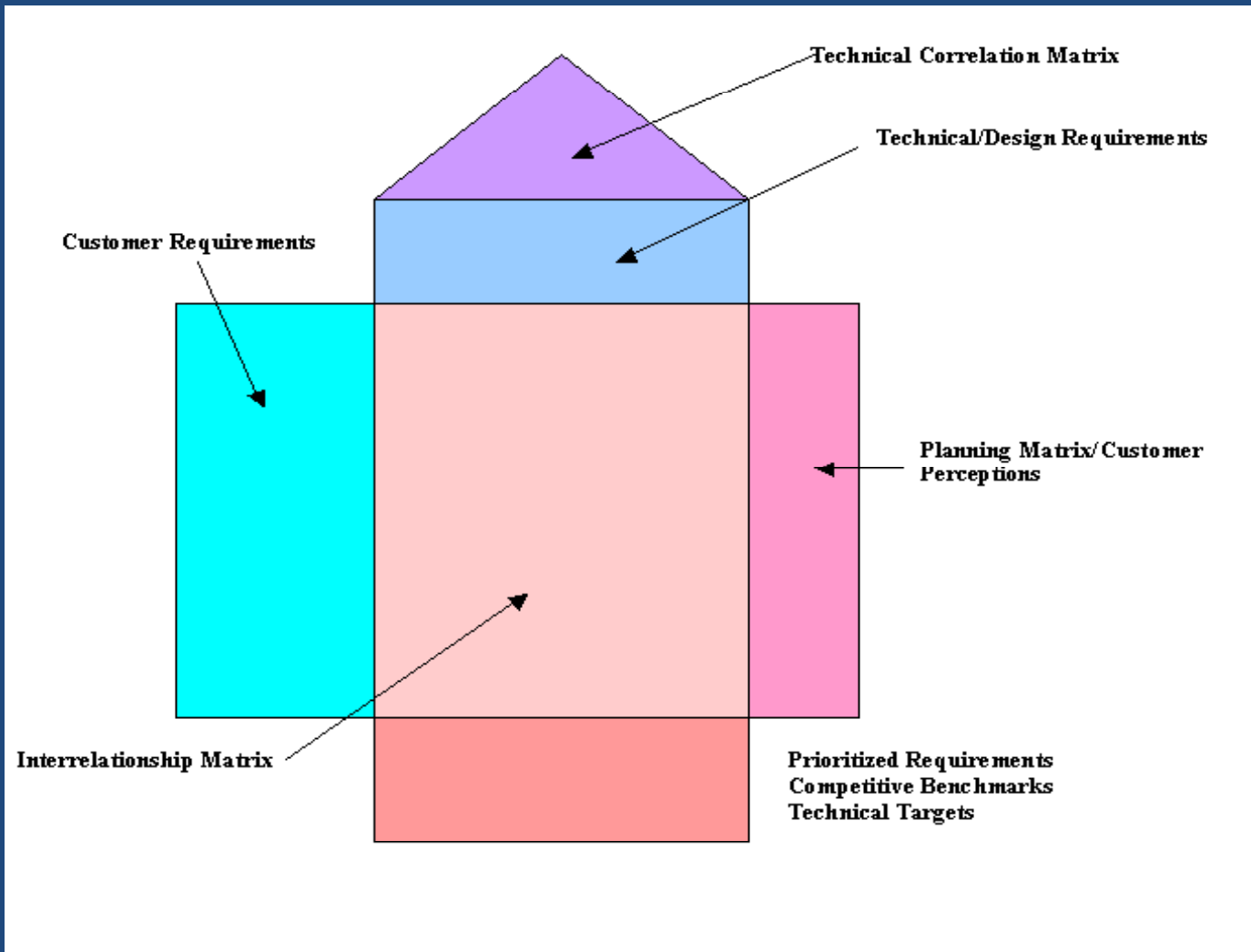
What is QFD?

- A method of transferring customer needs and requirements into technical specifications for new product and service development.

Quality Function Deployment

- ✓ Identify customer wants
- ✓ Identify how the good/service will satisfy customer wants
- ✓ Relate customer wants to product
- ✓ Identify relationships between the firm's
- ✓ Develop importance ratings
- ✓ Evaluate competing products
- ✓ Compare performance to desirable technical attributes

QFD House of Quality



Even though technologies are getting newer, the clinical assay market is growing at a slow rate. A slow, but steadily growing market and declining sales for old assays are also becoming the major challenges. To adapt, IVD companies are employing various market-oriented strategies to these changes, including:

Product development (Diagnostic menu expansion)

Increasing the breadth of the product line (Disease-based menu Filling)

Improve the quality with cost reduction etc

New Product Innovation and Introduction

New-to-the-world(10%)

New product lines(20%)

Additions to existing lines(26%)

Improvements/revisions(26%)

Repositioning(7%)

Cost reductions: similar performance at lower cost(11%)

Product Modification

Feature modification(functional):

make more attractive to consumer.

Quality modification:

continues quality improvements.

Style modifications:

most frequent modification

Image modification:

associated with style and quality. It concentrates on changing the non product attributes.

IMPACT OF NEW TECHNOLOGY ON COST

**Divergent opinions regarding the economics
of laboratory technology exist**

1- technology increases the total costs of providing health care and that the benefits do not equal the expense accrued as a result of technology

The labor-saving potential of a new technology may be overestimated by the manufacturer or laboratory director, or other costs, such as reagents, maintenance, or replacement equipment, may negate any savings realized as a result of labor reduction and, therefore, must be included in the financial calculations the increased costs associated with technology are proportional to the success of each innovation and that the new technology and its attendant costs permit the treatment of many diseases that formerly were non treatable

2- technology as the most economic mechanism to enhance both service and quality and offset the costs associated with these improvements through increased productivity

although data suggest that technology has enabled an increase in test demand to be almost offset by increased productivity, the trade-off may not be cost-effective unless the new technology offers more information, since an increase in test availability may induce increased test ordering, causing an increase in the laboratory cost per patient admission

Increase Health care costs worldwide

Cost Containment Pressures

Improved Efficiency
*Improved Productivity through Automation
*Increased Purchasing power

Lab Consolidation

Lower profit margin for IVD manufacturer

IVD manufacturer consolidation achieve
*Economies of Scale
*Breadth of offering
*R&D Critical mass

New opportunities by technological innovation

Less Differentiation in standard offering among companies

What Can Do Industry?

Technology Life Cycle

Customization

Flexibility

Cost Reduction

Energy Saving

Cost Reduction Per test

(reducing the volumes of the reagents used)

Increase productivity(general and specific menu)

Decrease of QC/QA cost by different procedures

No need to highly professional staff

Multiplexing

Local manufacturer to reduced cost

Beneficial Outcome Associated with Increased Laboratory Testing

**a beneficial relationship between an increased number
of test results and various outcome indicators**

Future of New Technology 2013

Medtech Industry is making switch to value-based innovation

the medical technology industry in Europe is changing the way it is doing business and is progressing towards making value-based innovations available to patients

MedTech Europe concludes that most companies are indeed moving to make value-based innovations - therapies which either deliver improved health outcomes at similar costs, or similar health outcomes at lower cost compared with current therapies - available to European patients and Europe's healthcare systems

