

Fundamentos de la Informática I

2022

PARAGUAYO
ALEMANA

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Decision Support Systems (Parte 1)



UPA

UNIVERSIDAD PARAGUAYO ALEMANA
DE CIENCIAS APLICADAS

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CHAPTER TWO

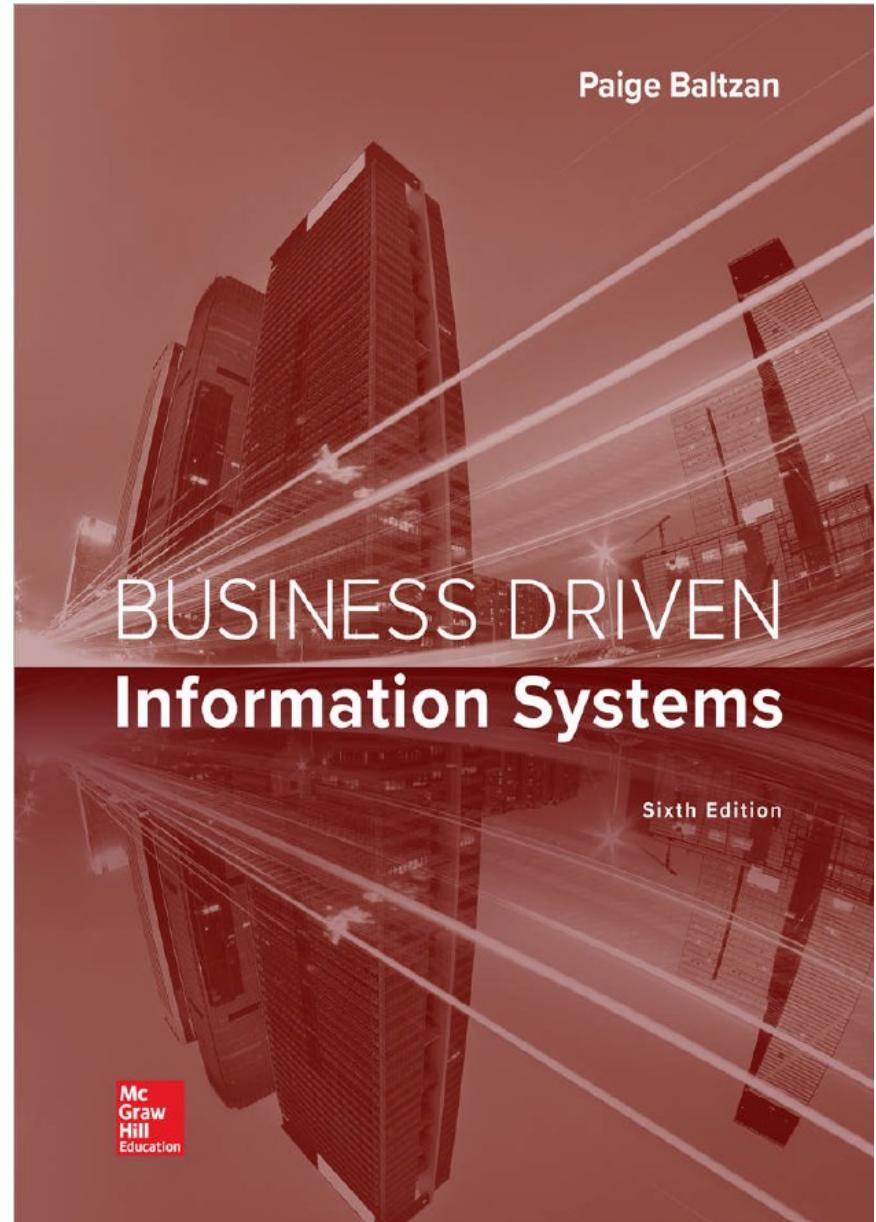
DECISIONS

AND

PROCESSES

VALUE DRIVEN

BUSINESS



CHAPTER TWO OVERVIEW

- **SECTION 2.1 – Decision Support Systems**
 - Making Organizational Business Decisions
 - Measuring Organizational Business Decisions
 - Using MIS to Make Business Decisions
 - Using AI to Make Business Decisions
- **SECTION 2.2 – Business Processes**
 - Managing Business Processes
 - Using MIS to Improve Business Processes

SECTION 2.1 - DECISION SUPPORT SYSTEMS

LEARNING OUTCOMES

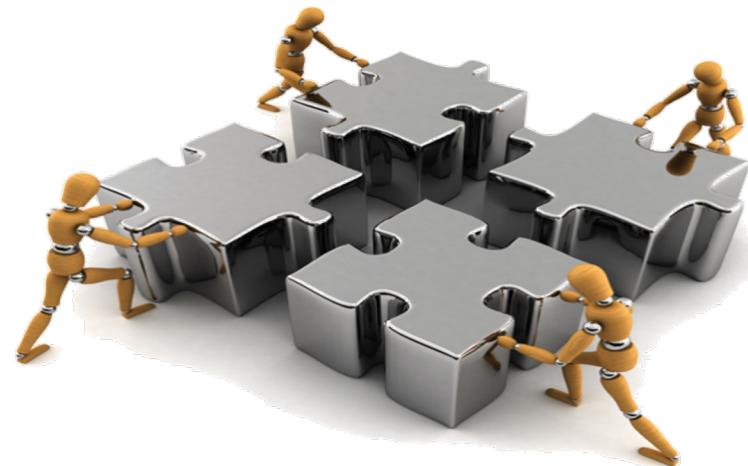
1. Explain the **importance of decision making** for managers at each of the three primary organization levels along with the associated decision characteristics
2. Define **Critical Success Factors (CSFs)** and **Key Performance Indicators (KPIs)**, and explain how managers use them to measure the success of MIS projects
3. Classify the different Operational, Managerial, and Strategic support systems, and explain how managers can use them to make decisions & gain competitive advantage
4. Describe artificial intelligence and identify its five main types

MAKING ORGANIZATIONAL BUSINESS DECISIONS

Why IS to decision-making?

- Managerial decision-making challenges
 - ❖ Analyze large amounts of information
 - ❖ Apply sophisticated analysis techniques
 - ❖ Make decisions quickly

PREGUNTA: ¿Por qué dos personas que analizan los mismos datos pueden extraer un valor completamente diferente de información?



Diferentes experiencias personales

Diferentes herramientas para analizar información

The Decision-Making Process

❖ The six-step decision-making process

1. Problem identification
2. Data collection
3. Solution generation
4. Solution test
5. Solution selection
6. Solution implementation



The Decision-Making Process

Ejemplos de preguntas que debemos hacer en el proceso

1



Problem Identification: Define the problem as clearly and precisely as possible.

Identificación del problema: ¿Cuáles son los problemas clave que afectan al negocio? ¿Qué dice el cliente sobre el servicio y el producto? ¿Cuál es la causa raíz de cualquier disminución en los ingresos o el tiempo de producción?

2



Data Collection: Gather problem-related data, including who, what, where, when, why, and how. Be sure to gather facts, not rumors or opinions about the problem.

Recopilación de datos: ¿por qué ciertos procesos se quedan cortos? ¿Y cuáles son los pasos inmediatos que la empresa puede tomar para ajustar los procesos actuales para mejorarlos? ¿A quién estás escuchando, son quejas reales o de rumores? ¿Qué departamentos están luchando?

The Decision-Making Process

3

Solution Generation: Detail every solution possible, including ideas that seem farfetched.



Generación de soluciones: ¿Cuáles son algunas de las soluciones que tiene para mejorar? ¿Cuáles son algunas de las soluciones que tiene su equipo de gestión? ¿Cómo harás para recolectar las mejores soluciones?

4

Solution Test: Evaluate solutions in terms of feasibility (can it be completed?), suitability (is it a permanent or a temporary fix?), and acceptability (can all participants form a consensus?).



Prueba de solución: ¿Son estas soluciones soluciones a largo o corto plazo? ¿Cuáles son algunos de los factores de costo asociados con las soluciones? ¿A su equipo le gusta la solución o la van a sabotear porque no están contentos con la decisión tomada?

The Decision-Making Process

5

Solution Selection: Select the solution that best solves the problem and meets the needs of the business.



Selección de la solución: Como líder ejecutivo de la empresa, ¿se siente cómodo con la decisión que tomó? ¿Cómo vas a tomar una fuerte iniciativa en esta decisión sin alienarte?

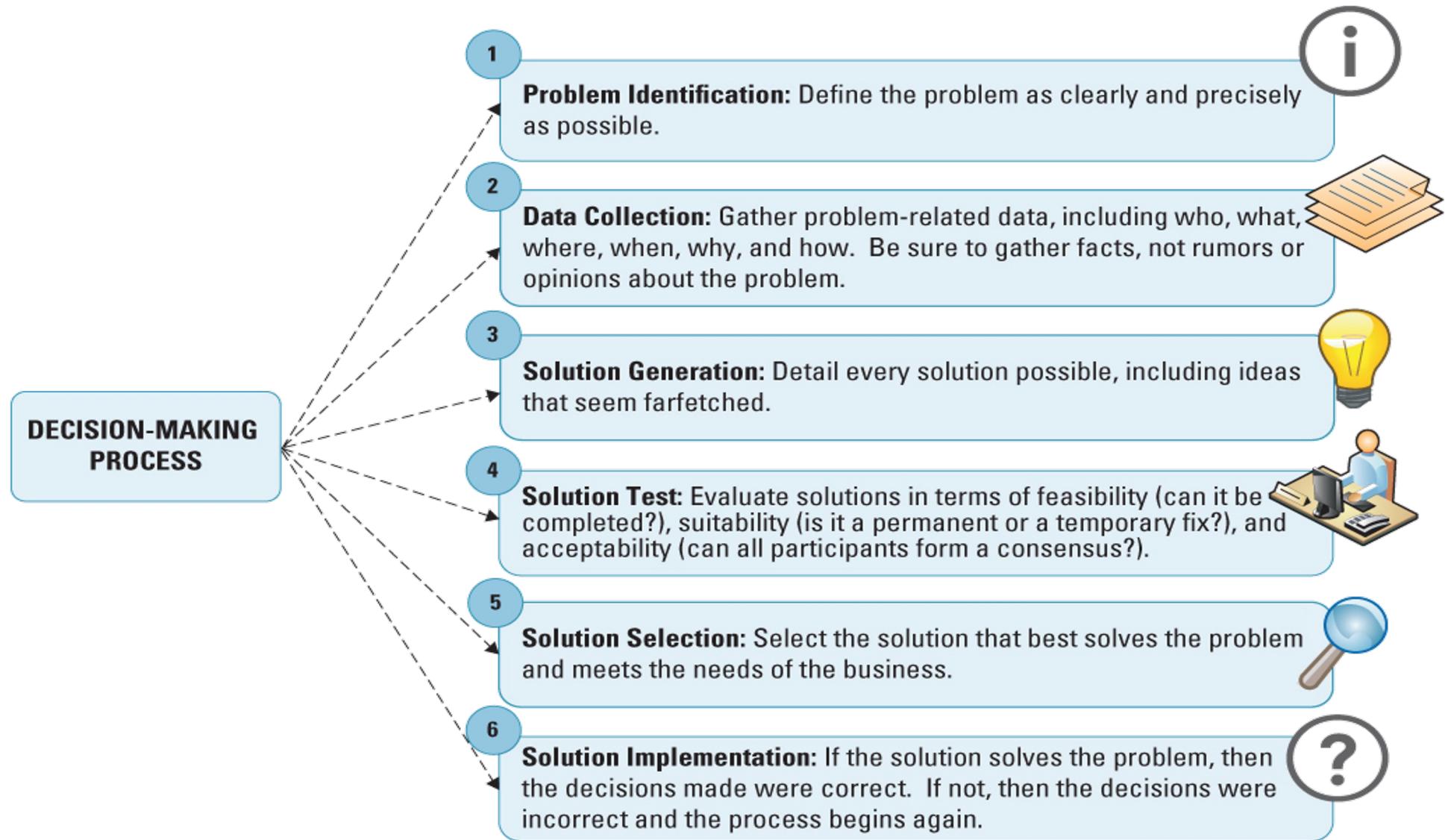
6

Solution Implementation: If the solution solves the problem, then the decisions made were correct. If not, then the decisions were incorrect and the process begins again.



Implementación de la solución: ¿Evaluar y rastrear cómo funciona la solución? ¿Está logrando los resultados que quería? ¿Los resultados son pobres? ¿Qué pasos debe tomar para adaptarse? Como líder de la empresa, ¿cómo va a cambiar adecuadamente la dirección de la solución sin alterar el entorno o el flujo de los empleados y la producción?

The Decision-Making Process



Q: Aplicamos el proceso para la fila de Burger King, McDonalds, Bellini

Decision-Making Essentials

Decision-making and problem-solving occur at each level in an organization



Q: ¿De que depende la forma en que se toman decisiones en una empresa/organización? 11

Decision-Making Essentials

- ❖ **Operational decision making** - Employees develop, control, and maintain core business activities required to run the day-to-day operations

- ❖ **Structured decisions** - Situations where established processes offer potential solutions



Payroll, Training & Development,
Employee record keeping,
Scheduling, Order processing,
Order tracking

Decision-Making Essentials

- ❖ **Managerial decision making –**
Employees evaluate company operations to identify, adapt to, and leverage change

- ❖ **Semistructured decisions –**
Occur in situations in which a few established processes help to evaluate potential solutions, but not enough to lead to a definite recommended decision

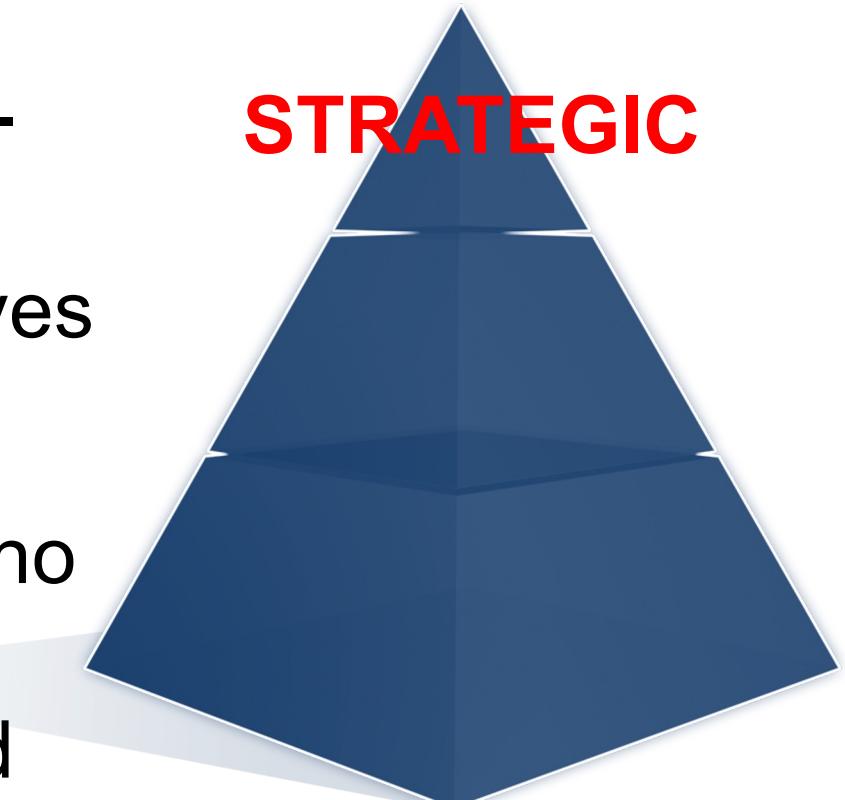


Sales management, Pricing & profitability, Contract Analysis, Production costs, Sales analysis by region, etc.

Decision-Making Essentials

- ❖ **Strategic decision making –**

Managers develop overall strategies, goals, and objectives



STRATEGIC

- ❖ **Unstructured decisions –**

Occurs in situations in which no procedures or rules exist to guide decision makers toward the correct choice

Sales trend forecasting, Budget forecasting, Profit planning, 5-year forecasting planning

Decision-Making Essentials

| NIVEL | EJEMPLOS | TIPOS DE SISTEMAS / ACTIVIDADES |
|-------------|---|--|
| OPERACIONAL | <ul style="list-style-type: none"> * ¿Cuántos empleados están enfermos? * ¿Cuántos productos hay que hacer hoy? * ¿Cuáles son los requisitos de producción de la próxima semana? * ¿Cuánto inventario hay en el almacén? * ¿Cuántos problemas ocurrieron al ejecutar la nómina? * ¿Qué empleados están de vacaciones? | <ul style="list-style-type: none"> * Nómina de sueldos * Entrenamiento y desarrollo * Cuentas por pagar y por cobrar * Mantenimiento de registros de empleados * Programación * Procesando orden * Rastreo de orden |
| GERENCIAL | <ul style="list-style-type: none"> * ¿Quiénes son nuestros mejores clientes por región, por representantes de ventas, por producto? * ¿Cuáles son las previsiones de ventas para el próximo mes? ¿Cómo se comparan con las ventas reales del año pasado? * ¿Cuál fue la diferencia entre las ventas esperadas y las ventas reales para cada mes? * ¿Cuál fue el impacto de la campaña de marketing del mes pasado en las ventas? | <ul style="list-style-type: none"> * Gestión de ventas * Precios y rentabilidad * Análisis de contrato * Costos de producción * Análisis de ventas por región * Inventario * Auditorias |
| ESTRATÉGICO | <ul style="list-style-type: none"> * ¿Cómo afectarán los cambios en los niveles de empleo en los próximos tres años a la empresa? * ¿Qué tendencias de la industria valen la pena analizar? * ¿Qué nuevos productos y nuevos mercados necesita la empresa para crear ventajas competitivas? * ¿Cómo afectará una recesión en los próximos años al negocio? * ¿Para qué medidas deberá prepararse la empresa debido a las nuevas leyes? | <ul style="list-style-type: none"> * Previsión de tendencias de ventas * Previsión presupuestaria * Planificación de ganancias * Planificación de pronósticos a 5 años. |

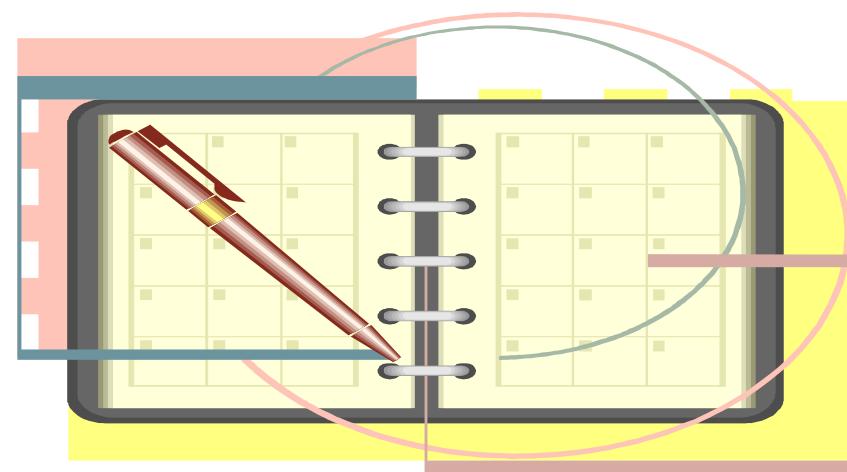
Overview of Decision Making

| | STRATEGIC LEVEL | MANAGERIAL LEVEL | OPERATIONAL LEVEL |
|-----------------------|--|---|--|
| Employee Types | <ul style="list-style-type: none"> ■ Senior management, presidents, leaders, executives | <ul style="list-style-type: none"> ■ Middle management, managers, directors | <ul style="list-style-type: none"> ■ Lower management, department managers, analysts, staff |
| Focus | <ul style="list-style-type: none"> ■ External, industry, cross company | <ul style="list-style-type: none"> ■ Internal, crossfunctional (sometimes external) | <ul style="list-style-type: none"> ■ Internal, functional |
| Time Frame | <ul style="list-style-type: none"> ■ Long term—yearly, multiyear | <ul style="list-style-type: none"> ■ Short term, daily, monthly, yearly | <ul style="list-style-type: none"> ■ Short term, day-to-day operations |
| Decision Types | <ul style="list-style-type: none"> ■ Unstructured, nonrecurring, one time | <ul style="list-style-type: none"> ■ Semistructured, ad hoc (unplanned) reporting | <ul style="list-style-type: none"> ■ Structured, recurring, repetitive |
| MIS Types | <ul style="list-style-type: none"> ■ Knowledge | <ul style="list-style-type: none"> ■ Business intelligence | <ul style="list-style-type: none"> ■ Information |
| Metrics | <ul style="list-style-type: none"> ■ Critical success factors focusing on effectiveness | <ul style="list-style-type: none"> ■ Key performance indicators focusing on efficiency, and critical success factors focusing on effectiveness | <ul style="list-style-type: none"> ■ Key performance indicators focusing on efficiency |

MEASURING ORGANIZATIONAL BUSINESS DECISIONS

- **Project** – A temporary activity a company undertakes to create a unique product, service, or result
- **Metrics** – Measurements that evaluate results to determine whether a project is meeting its goals

Q: ¿Por qué querrían definir métricas para evaluar el éxito de un proyecto?





All metrics must be:

Numerical: although we are trying to measure subjective indicators, such as, for example, the quality of service, we must **always give it a numerical form**. In this way, it will also be comparable between measurement periods.

Actionable: it should lead us to make decisions in an **agile way** to change strategies.

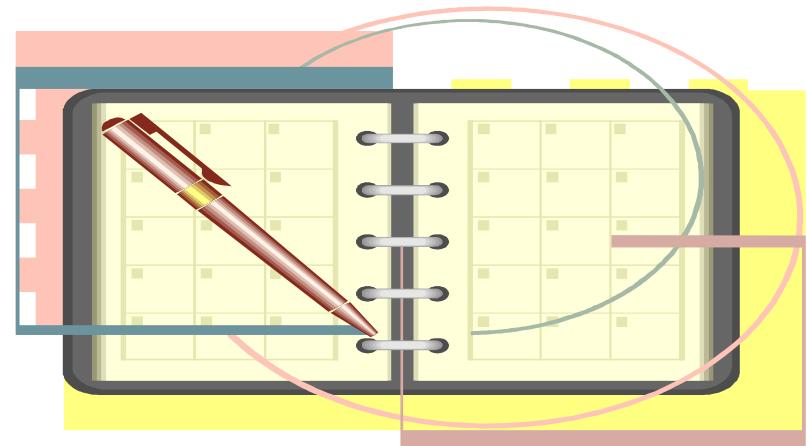
Aligned: must be **consistent with our current global strategy**. That is, we do not use metrics in order to decorate our consolidation plan.

Understandable: we must have it **in writing** and have **shared** it with our entire team. It is easy, especially at the beginning, to forget how we had defined a metric, how to calculate it or its usefulness.

MEASURING ORGANIZATIONAL BUSINESS DECISIONS

Q: ¿Qué tipos de métricas aplicarían a las siguientes situaciones?
¿Cómo los ayudarían las estadísticas a determinar si su decisión fue exitosa?

- Comprar un auto nuevo
- Comprar una casa
- Alquilar un apartamento
- Comprar un nuevo edificio de oficinas
- Comprar seguro de salud para empleados



MEASURING ORGANIZATIONAL BUSINESS DECISIONS

Critical Success Factors (CSFs) – The crucial steps companies make to perform to achieve their goals and objectives and implement strategies.

- ❖ Create high-quality products
- ❖ Retain competitive advantages
- ❖ Reduce product costs
- ❖ Increase customer satisfaction
- ❖ Hire and retain the best professionals



Q: ¿Cuál serían tus CSFs?

MEASURING ORGANIZATIONAL BUSINESS DECISIONS

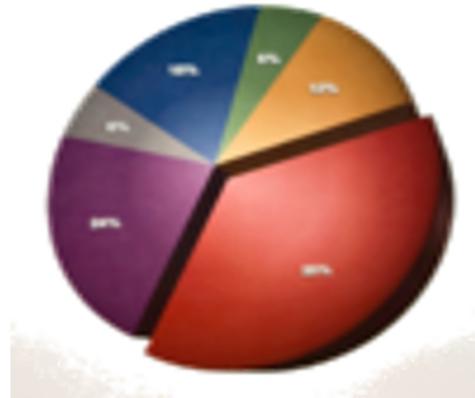
Key performance indicators (KPIs) – The quantifiable metrics a company uses to evaluate progress toward critical success factors

- ❖ Turnover rates of employees
- ❖ Number of product returns
- ❖ Number of new customers
- ❖ Average customer spending



One CSF can have many KPIs

MEASURING ORGANIZATIONAL BUSINESS DECISIONS



- **External KPI**

Market share – The portion of the market that a firm captures (external)



- **Internal KPI**

Return on investment (ROI) –
Indicates the earning power of a project

Fuente:

KEY PRFORMANCE INDICATORS IN SMALL AND MEDIUM SIZED ENTERPRISES

Mirela Nastasiea,
Costel Mironeasa

Table 1. Examples KPI from SME

| Category | Key Performance Indicator |
|---------------------|--|
| Customer | 1. the status of existing customers 2. new customers they acquired 3. customer fidelity 4. segmenting customers by profitability or demographics 5. waiting time for customer orders |
| Maintenance | 1. maintenance time/produced output over a time period 2. number of alarms over a time period |
| Personnel | 1. accident/incident rate per number of man hours worked 2. considerate contractors score |
| Process | 1. progress against schedule (days behind or ahead of schedule expresses as %) 2. % of required reports delivered on time 3. number of defects at 1 month post practical completion 4. average process overdue time 5. percentage of overdue processes 6. average process age 7. percentage of processes where the actual number of assigned resources is less than planned 8. number of assigned resources 9. sum of costs of "killed"/stopped active processes 10. sum of deviation of time against planned schedule of all active projects |
| Innovation process | 1. number of identified unmet needs 2. number of ideas by staff 3. the number of new competencies for innovation 4. number of managers having training in the methods and tools of innovation 5. number of patents per year per employee 6. number of awards, publications 7. the higher rate of productivity 8. number of improved products, processes 9. lifetime of an innovative product 10. number of products launched in the last year |
| Quality | 1. cycle time from request to delivery 2. call length – the time to answer a call 3. number of escalations - how many bad 4. number of reminders - how many at risk 5. number of alerts – overall summary 6. customer ratings of service – customer satisfaction 7. number of customer complaints – problems |
| Efficiency | 1. cycle time from request to delivery 2. average cycle time from request to delivery 3. volume of tasks per staff 4. number of staff involved 5. number of alerts 6. customer ratings of service 7. number of customer complaints 8. number of process errors 9. number of human errors 10. time allocated for administration, management, training |
| Control performance | 1. number of control loops in manual mode/total number of control loops 2. variance of control error (set-point-measured value) 3. setting time after a set-point change |
| Equipment | 1. heat transfer rate of heat exchangers 2. number of valve openings for a valve or total valve opening travel distance 3. vibration amplitude of an equipment 4. employee suggestions/ employee competence measures/employee morale |
| Financial | 1. cash flows 2. product profitability 3. return on sales 4. return on capital 5. return on equity |
| Environmental | 1. energy consumption (MWh/m ³ /year) (gas, electricity, heat, oil, biomass, etc) 2. % by weight, of construction waste sent for recycling 3. Hours of industry activities 4. percentage use of recyclable materials 5. amount of pollutant discharge |
| Competitor | 1. delivery performance 2. price performance 3. quality performance 4. proportion of new products 5. new-product development cycle time |
| Market and customer | 1. share of market 2. response time 3. warranties, claims, returns 4. market/channel/customer profitability 5. customer satisfaction or dissatisfaction indices |
| Business process | 1. product (defect, scrap, rework, waste etc.) 2. order to delivery response times 3. manufacturing cycle time 4. sales (production) per employee 5. inventory turns 6. reinvestment indicators 7. health and safety performance |

Welcome Diana Benitez

KPI Library is an initiative of [ServiceNow](#). KPI Library helps you to find the right performance indicators categorized by industry, by process and by business framework.

Suggested KPI sections

- [Information Technology](#)
- [PMBOK | Project Portfolio](#)
- [PRINCE2 | Project Portfolio](#)
- [Project Portfolio](#)
- [Quality, Improvement & Innovation](#)
- [VRM Information Technology](#)

Browse KPIs by Industry

- [Accommodation & Food](#) (130)
- [Agriculture & Forestry](#) (46)
- [Banking & Insurance](#) (98)
- [Biotechnology & Life Sciences](#) (1)
- [Construction & Engineering](#) (13)
- [Education & Research](#) (149)
- [Emergency, Police & Justice](#) (63)
- [Entertainment, Recreation & Arts](#) (118)
- [Goods & Manufacturing](#) (25)
- [Government & Public Works](#) (142)
- [Healthcare & Social Assistance](#) (194)
- [Media & Publishing](#) (89)
- [Mining, Oil & Gas Extraction](#) (11)
- [Miscellaneous](#) (42)
- [Professional & Technical Services](#) (35)
- [Real Estate, Rental & Leasing](#) (82)
- [Technology](#) (74)
- [Telecommunications](#) (95)
- [Transportation & Warehousing](#) (256)
- [Utilities](#) (161)
- [Wholesale & Retail](#) (101)

Browse KPIs by Process

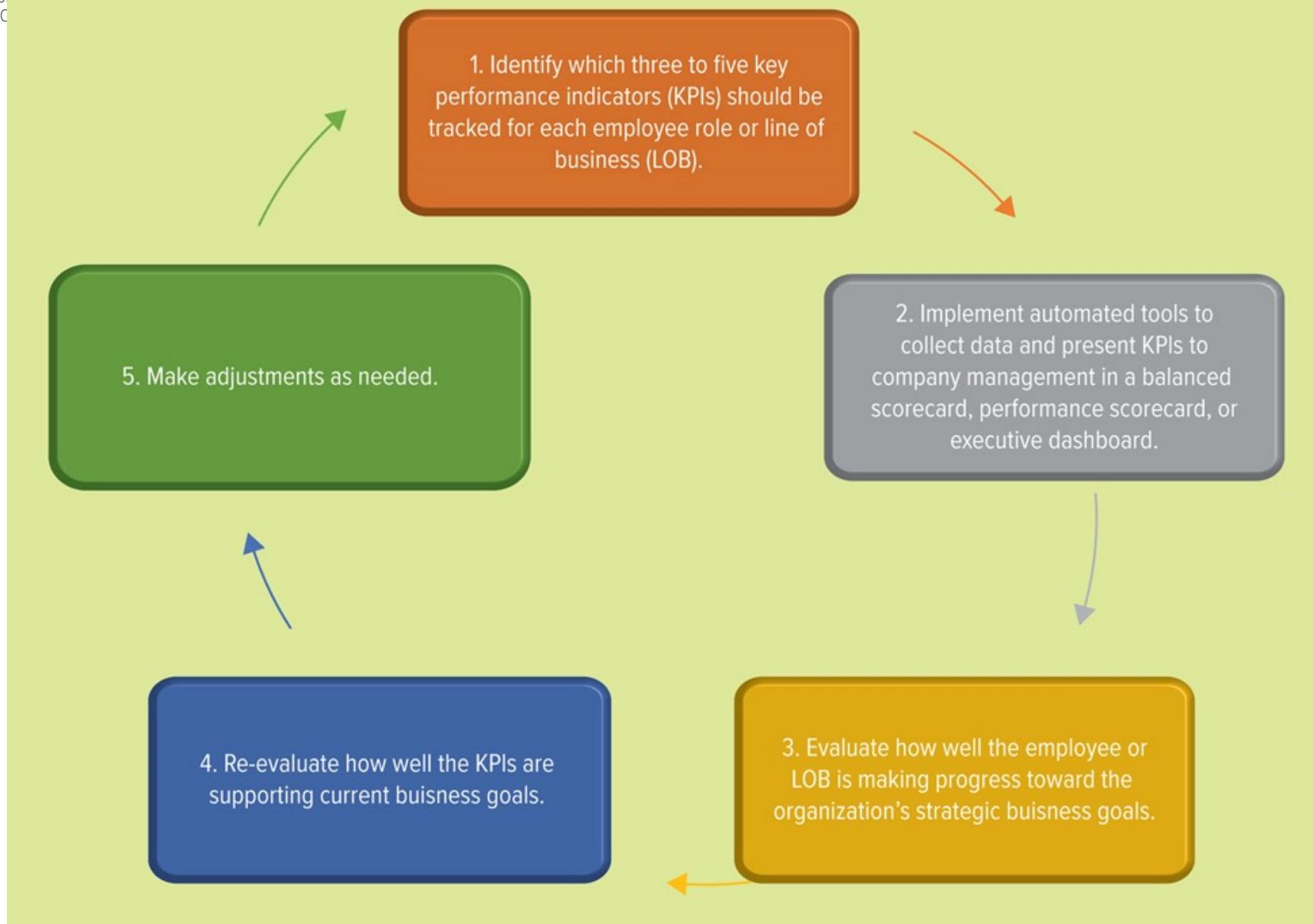


Prebuild connectors for:

- | | |
|--|---|
|  | Incident Management Performance Analytics for Incident Management. KPIs, Scorecards & Dashboards. |
|  | Change Management Performance Analytics for Change Management. KPIs, Scorecards & Dashboards. |
|  | Problem Management Performance Analytics for Problem Management. KPIs, Scorecards & Dashboards. |

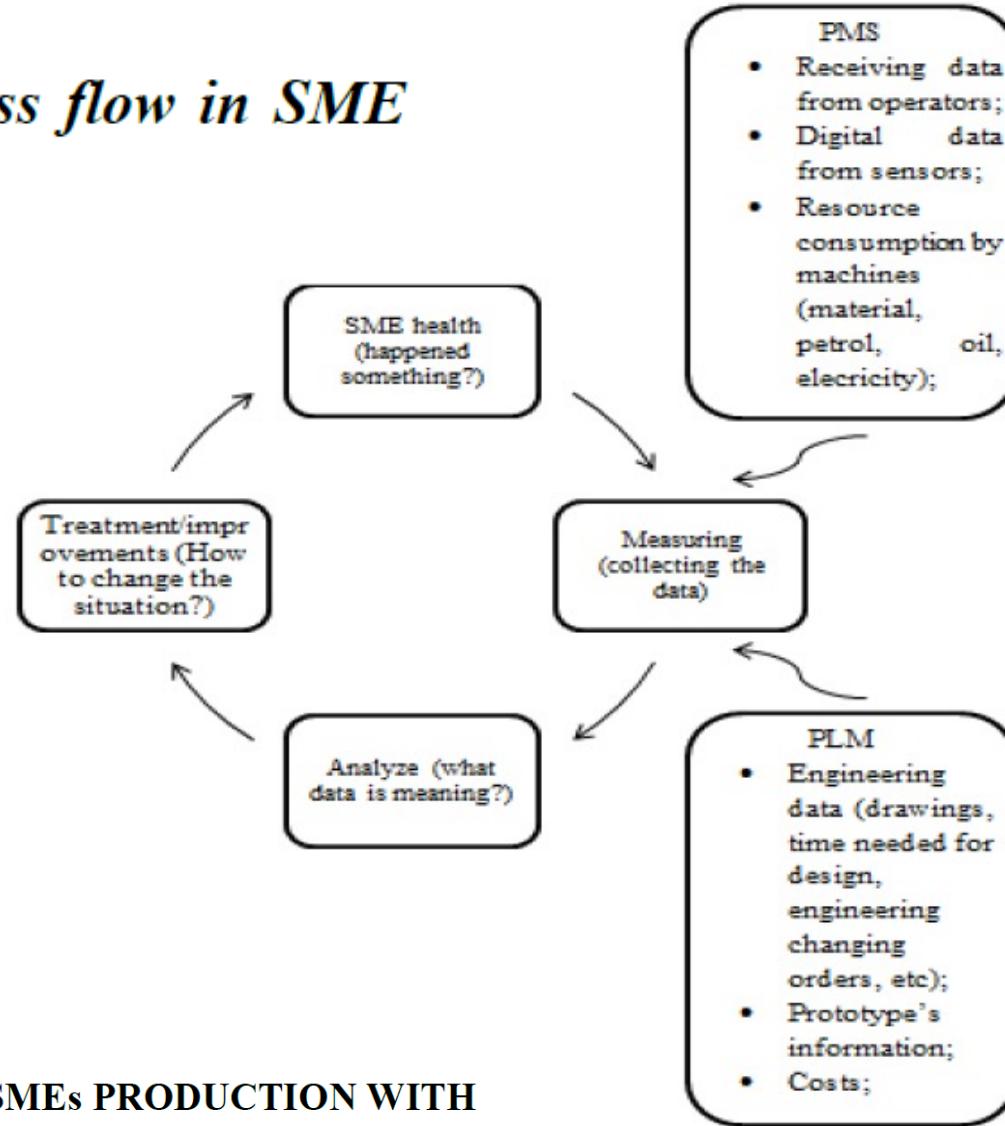
Other Resources

- [Browse KPIs](#)
- [Answers](#)
- [Benchmarks](#)
- [News](#)
- [Expert Blogs](#)



Method for Defining KPIs

Figure 1: KPIs process flow in SME



Fuente:

**SELECTING THE RIGHT KPIs FOR SMEs PRODUCTION WITH
THE SUPPORT OF PMS AND PLM**

Sergei Kaganski, Aleksei Snatkin, Marko Paavel, Kristo Karjust

Modelo S.M.A.R.T

Una vez que se hayan establecido los **Critical Success Factors** que pueden ser vistos como objetivos, sabremos qué es lo que queremos medir, pasaremos a establecer los KPIs utilizando el **modelo S.M.A.R.T.**

- **Specific (específicos):** Describe exactamente qué es lo que quieras lograr. Para que te sea más fácil, puedes partir de tu objetivo generalista, y a partir de él pensar en algo más específico pudiendo incluso dividirlo en varios para poder ir al detalle.
- **Mesurable (medible):** Cuantifica el objetivo para saber realmente a qué nivel pretendes llegar, y sobre todo, para poder medir la evolución y ver si las acciones puestas en marcha son suficientes para alcanzarlo.

Fuente: <https://vilmanunez.com/indicadores-kpi/>

Modelo S.M.A.R.T

- **Archivable (alcanzable):** Evitar frustraciones en el equipo y conseguir que realmente tu estrategia se mantenga viva y funcione, depende en gran medida de que encuentres el punto de equilibrio adecuado entre la ambición y la realidad. Ten en cuenta cual es tu situación actual y tendencia de crecimiento hasta el momento, así como el posicionamiento de tu competencia, para poder plantear objetivos alcanzables en función del presupuesto de inversión, tiempo disponible y equipo que va a aunar fuerzas para conseguirlo.
- **Realistic (realista):** No podemos establecer objetivos sin tener contacto con la realidad. Los resultados obtenidos serán unos u otros en función de los recursos que estés dispuesto a invertir y acciones a implantar.
- **Time-related (acotado en el tiempo):** Un objetivo debe cumplirse en un momento determinado, de lo contrario habrá que reformularlo. Podemos hablar de objetivos a largo plazo (1 año), medio plazo (trimestral o mensual) y corto plazo (mensual o semanal). Lo ideal es fijar en el calendario con un color bien llamativo las fechas en las que se quiere alcanzar un objetivo concreto.

Fuente: <https://vilmanunez.com/indicadores-kpi/>

MEASURING ORGANIZATIONAL BUSINESS DECISIONS

Critical Success Factors

Crucial steps companies perform to achieve their goals and objectives and implement their strategies

- Create high-quality products
- Retain competitive advantages
- Reduce product costs
- Increase customer satisfaction
- Hire and retain the best business professionals

Key Performance Indicators

Quantifiable metrics a company uses to evaluate progress toward critical success factors

- Turnover rates of employees
- Percentage of help desk calls answered in the first minute
- Number of product returns
- Number of new customers
- Average customer spending

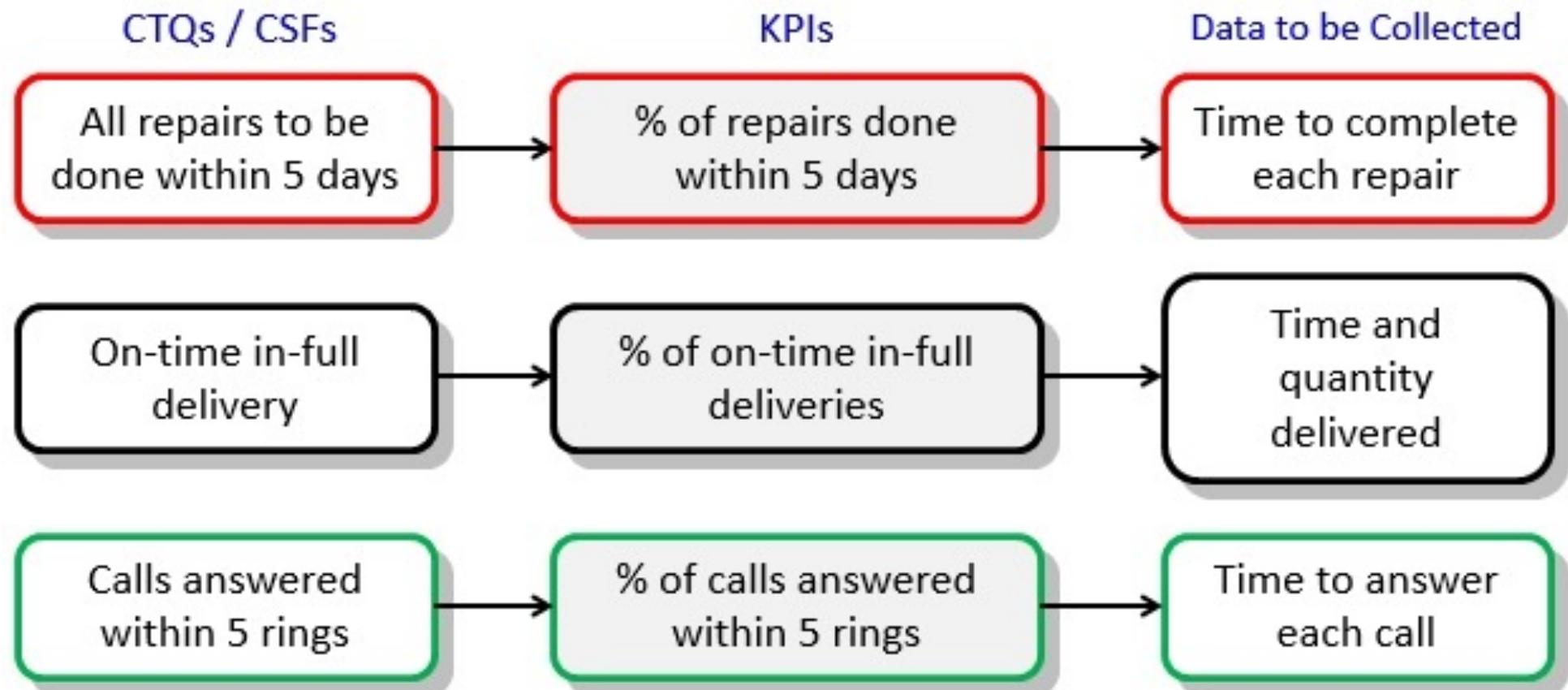
MEASURING ORGANIZATIONAL BUSINESS DECISIONS

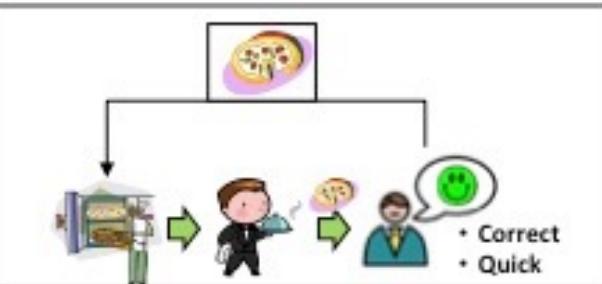
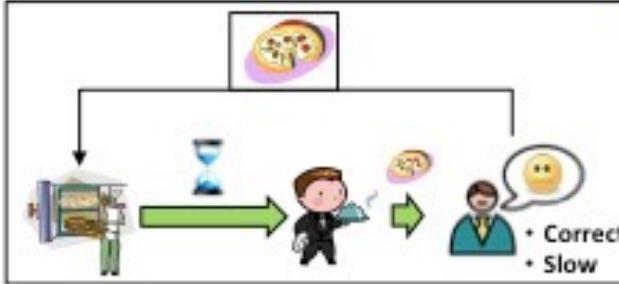


Source: www.BSCDesigner.com

MEASURING ORGANIZATIONAL BUSINESS DECISIONS

¿Cómo recogemos las métricas?



**Effective and Efficient****Effective but Inefficient**

Health and Quality attributes are critical to be effective

Effectiveness makes you excel

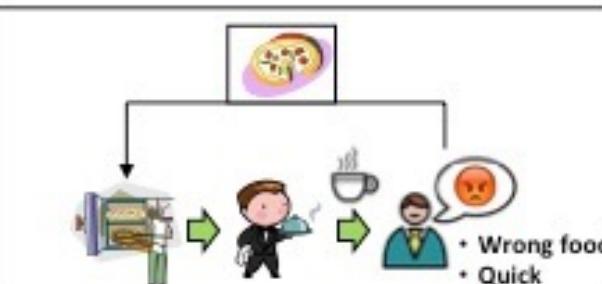
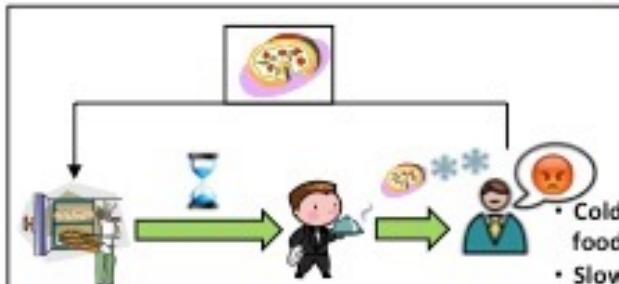
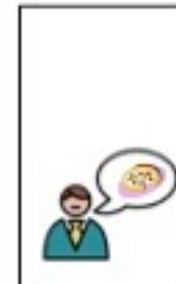
Eficiencia

Efficient: Do things right
Effective: Do the right things

Efectividad

Delivery and Cost attributes are critical to be efficient

Efficiency keeps you in the market

**Ineffective but Efficient****Ineffective and Inefficient**

Efficiency and Effectiveness Metrics

- ❖ **Efficiency MIS metrics** – Measure the performance of MIS itself, such as throughput, transaction speed, and system availability

 - ❖ **Effectiveness MIS metrics** – Measures the impact MIS has on business processes and activities, including customer satisfaction and customer conversation rates
- Eficiencia
- Efectividad



Efficiency and Effectiveness Metrics

EFFICIENCY Eficiencia

Throughput – the amount of information that can travel through a system

Transaction speed – the amount of time a system takes to perform a transaction

System availability – the number of hours a system is available

Information accuracy – How often a system generates the correct results when doing the same transaction many times

Response time – how long it takes to respond to user interactions. Ex) mouse click

EFFECTIVENESS Efectividad

Usability – the ease with which people perform transactions or find info

Customer satisfaction – measured by satisfaction surveys, how many retained, and increase in revenue per customer

Conversion rates – how many 'touches' it takes to convert a first time user to become a customer and purchase the product

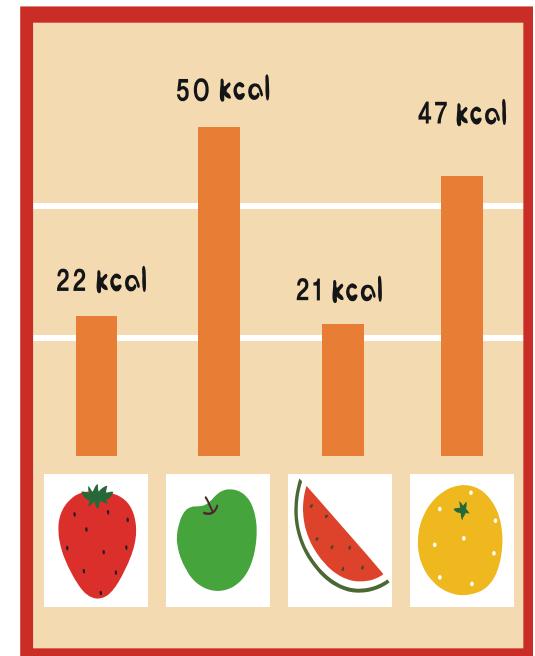
Financial – ROI, cost-benefit analysis, break-even analysis

Q: ¿Podrías dar algunos ejemplos?



The Interrelationship Between Efficiency and Effectiveness Metrics

- **Benchmark** – Baseline values the system seeks to attain
- **Benchmarking** – A process of continuously measuring system results, comparing those results to optimal system performance (benchmark values), and identifying steps and procedures to improve system performance



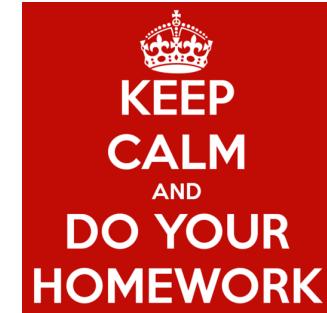
puntos de referencia

¿PREGUNTAS?



¿Qué aprendimos hoy?

TAREA



TEC#5 - Guía de Trabajo en el classroom

Tarea grupal - 2 personas

Entrega: Martes 16/08/2022 – 15:00hs.