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# IDENTIFICATION AND DEVELOPMENT OF OPERATIONAL KPI METRICS IN MANUFACTURING INDUSTRIES

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<p><b>Abstract</b></p> <p>The research was conducted within the framework of the TeknoHub initiative, with Iisalmen Teollisuuskylä Oy taking on the role of project manager. The targeted companies were company A, company B, company C, and company D. The aim of the research was to offer a thorough portrayal, identification, and evaluation of the existing KPIs within the client organizations. Further on, to assist both managers and decision-makers in making better decisions to manage the business transition and KPI usage effectively.</p> <p>The study highlighted the issue of KPI implementation from an innovation management perspective. The study presents a theoretical discussion about major areas of KPI usage and provides a theoretical framework to address the impact of business and digital transformations on improving business efficiency.</p> <p>The study is considered exploratory to understand the complexity of implementing KPIs and how they affect organizational transformation. The study resulted in a classification of the organizational hierarchy based on the importance of workflow optimization. Furthermore, a different technical proposal was suggested as an alternative, which was considered to be much more suitable for the current situation of the organization in question. The study findings yielded the adoption of a bottom-up leadership structure and the implementation of KRA as an essential evaluation metric. Additionally, it is recommended to take advantage of the ongoing digital transformation during this season. It is also advisable to allocate additional resources to the information technology department and optimize the use of the newly implemented enterprise resource planning (ERP) system.</p>	
<p><b>Keywords</b></p> <p>Key Performance Indicators, Metrics, OTD, OEE, SOA, ERP, KRA, Business transformation, Digital transformation</p>	

## CONTENTS

1	INTRODUCTION .....	5
1.1	Research objectives and questions .....	5
1.2	Structure of the Research .....	7
2	KEY PERFORMANCE INDICATORS .....	8
2.1	KPI .....	8
2.1.1	KPI indicator selection: how? .....	9
2.1.2	How many KPIs? .....	10
2.1.3	Group or segment KPIs? .....	11
2.1.4	KPI usages .....	11
2.2	Currently existing indicators .....	12
2.2.1	OTD .....	13
2.2.2	OEE .....	13
2.2.3	VAPP .....	14
2.2.4	PPM .....	15
2.3	KRA .....	15
2.3.1	KRA usages .....	16
2.3.2	KPI vs. KRA .....	16
3	BUSINESS TRANSFORMATION .....	18
3.1	Organizational hierarchy and workflow optimization .....	19
3.1.1	Workflow .....	20
3.2	Top-down and bottom-up approaches for better strategies .....	20
3.2.1	Top-Down Approach .....	21
3.2.2	Bottom-Up Approach .....	25
3.2.3	Top-Down vs. Bottom-Up Approach .....	28
4	DIGITAL TRANSFORMATION .....	29
4.1	Digitization .....	30
4.2	Digitalization .....	30
4.3	Digital Transformation .....	31
4.4	SOA transformation .....	32
4.5	ERP as a part of the SOA system .....	33
4.6	KPIs in digital transformation .....	34

5 CONCLUSION AND DISCUSSION.....	36
6 REFERENCES .....	38
APPENDIX 1. LIST OF VARIOUS PERFORMANCE INDICATORS.....	42

## LIST OF FIGURES

Figure 1. Strategy nucleus. (Alonso, 2022) .....	21
Figure 2. top-down approach. (Alonso, 2022) .....	22
Figure 3. Disadvantages of top-down approach. (Alonso, 2022) .....	23
Figure 4. Bottom-up Approach. (Alonso, 2022).....	25
Figure 5. Bottom-up Disadvantages. (Alonso, 2022) .....	27
Figure 6. Top-down Vs Bottom-up. (Alonso, 2022) .....	28

## ABBREVIATIONS

KPI	Key Performance Indicator
OEE	Overall Equipment Effectiveness
OTD	On-Time Delivery
VAPP	Value Added Per Person
PPM	Part Per Million
KRA	key Responsibility Area
SOA	Service Oriented Architecture
ERP	Enterprise Resource Planning
ROI	Return On Investment
CEO	Chief Executive Officer

## 1 INTRODUCTION

From time to time, it is necessary for companies to know how the marketing goals set by marketing specialists are achieved. In addition to the evaluation of currently used marketing channels, the perfect method for confirming that the right path taken is the "main performance indicators KPI", and effective tools for knowing whether the required results have already been achieved or not are basic performance standards. A large group of main performance measurement indicators are explained within this research.

Two interrelated yet separate concepts are metrics and KPIs. A concise rationale is presented below.

It is recommended to closely monitor KPIs in order to optimize strategic business outcomes. The focus of teams is directed towards crucial aspects and the overall strategy is reinforced by KPIs. An example KPI could be "new customers targeted per month." KPIs are a crucial means of ensuring that teams are effectively contributing towards the overarching goals of the organization.

The following are some primary rationales for the necessity of KPIs:

- The usefulness of KPIs is considered in team alignment. Shared objectives can be focused on by teams through KPIs, whether project outcomes or employee performance are relevant to these objectives.
- A health check can be offered: An accurate picture of the state of the company's finances and risk factors is given by KPIs.
- Making changes: The use of KPIs facilitates the identification of successes and failures, thereby enabling the implementation of strategies to amplify effective practices and minimize ineffective ones.
- It is recommended to implement KPIs that can be utilized by both employees and managers to monitor progress and hold teams accountable in order to ensure that value is contributed by each team member.

### 1.1 Research objectives and questions

These two primary research challenges were identified by the firm:

uncertainty regarding the relevant content of the manufacturing team's KPI dashboard and doubts about the real status of the On-Time Delivery performance indicator. The aim of the study was to develop a KPI dashboard and determine the means by which On-Time Delivery performance measurement processes could be enhanced by manufacturing teams within the company. Additionally, it was sought to identify the tools and actions that could be employed to prevent the loss of the indicator and improve overall reporting. The research inquiries were revised in the following manner to attain the research objective and tackle the identified issues:

Inquiry 1: What should be evaluated by the company's manufacturing team as their principal performance metrics in terms of the primary strategic components and value generators?

Inquiry 2: Which specific KPIs should be included in the KPI dashboard by company manufacturing teams?

Inquiry 3: What is the current state of the performance indicator for On-Time Delivery?

Inquiry 4: What is the underlying reason for the ineffectiveness of On-Time Delivery performance metrics?

The main issues at company A were:

- Delivery accuracy per individual and per machine.
- Increase the use of the Power BI tool.
- The switch from the old ERP to the new one, which starts on 1.5.2023.
- Create and implement a new KPI tool to be used by small teams of workers. There will be 4–6 teams. With 5–10 members per team. Teams should report themselves to the new KPI dashboard so that the workers would start to make small decisions in real life to ensure On-Time Delivery. Teams may decide upon getting their own sub-KPI as well.

The study aimed to answer the following questions:

**Question 1.** Identification of essential metrics? Metrics for different levels:

- Management
- Clerical employees
- workers

**Question 2.** What operational metrics, or KPIs (Key Performance Indicators), should an industrial company monitor?

**Question 3.** What is the importance of metrics for business and management decision-making?

**Question 4.** How can work efficiency be improved with the help of metrics?

**Question 5.** What is the impact of metrics in anticipating the future of an industrial company?

## 1.2 Structure of the Research

After the introductory chapter, which establishes the background and topic area of the research, the theoretical study, also known as the theoretical framework, is advanced into the thesis structure. The purpose of the theoretical framework was to elucidate the relevant research inquiries that were closely related to the research. Chapter Two delves into the topic of key performance indicators (KPIs), exploring their definition and practical application within organizational contexts. Chapter Two explores the various key performance indicators that were frequently employed in manufacturing operations and their potential application in the operations of the target organizations. Chapter Three presents a detailed account of the business transformation and operational activities of the companies. It also analyzed the top-down and bottom-up approaches to the management structure of the unit and who it linked to. Chapter Four deals with the digital transformation and opened-up delegated questions and inquiries regarding digital services and their impact on modern organizations. Chapters Five through Six of the manuscript details the research methodology, including the planning and execution of the study, and presents the findings, discussion, and conclusions.

## 2 KEY PERFORMANCE INDICATORS

### 2.1 KPI

KPIs can be defined as a set of values. All of these values are already measurable, and the basic use of basic performance standards is to make sure that the institution or company is actually achieving success and tracking the correct methods towards achieving the marketing goals of the company. The main performance measurement indicators are high-performance indicators, and through the performance indicators, the situation is evaluated to determine the extent of success achieved by the company with all of its employees.

In this context, suitable responses to the initial inquiry are being endeavored to be ascertained:

**Question 1.** Identification of essential metrics? Metrics for different levels:

- Management
- Clerical employees
- Workers

KPIs are derived from the goals. The purpose of following them is to find out whether or not they reach the set goals. However, the terms and performance indicators (KPIs) are not quite synonymous. Metrics tell you anything to measure, such as sorted documents or pages. KPIs, on the other hand, are ratios of multiple gauges with context and time intervals, such as sorted documents per hour. (Karhu 2011) Organizational performance indicators have been discussed and debated for decades. Measurement has often been used to implement organizations' strategies and monitor their success. (Järvinen 2014) "Using management's own measures of success really helps deepen investors' understanding of progress and movement in business. Whether contextual, financial, or non-financial, these data points make the trends in the business transparent and help keep management accountable," Roger Hirst. The Director of European Equity Research (Marian 2017, 2) The significance of KPIs is a topic of interest in various fields. The process of choosing and monitoring KPIs in a business context facilitates evidence-based decision-making and ensures that the team remains focused on achieving the overarching objectives of the organization. The act of making adjustments aids in the assessment of effective strategies and identifies areas that require optimization.

KPIs can be utilized as a means of measuring employee performance and maintaining accountability within the team. Informed decision-making is enabled by this process to enhance team performance.

The feature of monitoring company health provides a precise evaluation of the financial well-being of the organization. The analysis of patterns is a crucial aspect of measuring KPIs over a period of time. Through this process, it is possible to identify trends, such as the effectiveness of specific advertisements or the relative profitability of different periods throughout the year.



When deciding on the information to disclose regarding KPIs, the fundamental principles of business reviews should be considered by preparers. The subsequent elements ought to be encompassed by a comprehensive business review:

- A state of balance and comprehensiveness should be strived for in the analysis.
- The business review should be conducted in an impartial and equitable manner.
- Sufficient information should be disclosed to comprehend the progression, achievement, or status of the enterprise.

The maintenance of these three principles is of utmost importance in ensuring that transparent corporate reporting is achieved.

### 2.1.1 KPI indicator selection: how?

In this context, suitable responses to the second and third inquiries are being endeavored to be identified.

**Question 2.** What operational metrics, or KPIs, should an industrial company monitor?

**Question 3.** What is the importance of metrics for business and management decision-making?

The initial step in selecting the essential performance indicators for a specific company should be based on the ones utilized by the board to administer the enterprise. Several boards often receive financial performance indicators, despite their communication of strategies such as enhancing the customer experience or attracting and retaining top talent.

There is a question of whether or not the KPIs currently presented to the board are adequate for evaluating progress towards the stated strategies and whether or not they enable external readers to conduct a comparable evaluation upon reporting. If not, is that because of a lack of relevant data, or because the issue is still being handled at the departmental level before being brought before the board for consideration?

There are measures for each measure type:

1. An overall summary of how the organization is performing is given to the board by key result indicators (KRIs).
2. How teams are combining to produce results is told to management by result indicators (RIs).
3. What teams are delivering is told to management by performance indicators (PIs).
4. How the organization is performing 24/7, daily, or weekly in their critical success factors is told to management by key performance indicators (KPIs), and by taking action, performance can be dramatically increased. (Parmenter 2019, 2)

It is widely acknowledged that all measures have the potential to yield unintended consequences, commonly referred to as the "dark side." In this regard, it is possible that staff may take remedial actions that are contrary to the intended outcomes. Prior to being designated as a KPI, a

performance measure must undergo testing to verify its efficacy in facilitating team alignment towards organizational benefit. One potential unintended outcome that may arise from evaluating all of the chosen KPIs is the need to verify that none of them are substantial or noteworthy. (Parmenter 2019, 11)

It is not necessary for management to feel obligated to generate KPIs that align with those disclosed by their colleagues. It is imperative that the KPIs be pertinent to the specific organization. In order to facilitate comparisons with other companies' choices, it is recommended that management provide adequate detail on measurement methods and contextualize their decisions within the chosen strategies and objectives. The chosen KPIs should be evaluated by management to see if they remain useful over time. Reporting on the same KPIs as in earlier periods is inappropriate because strategies and objectives change over time. Additionally, as management has access to more data, new KPIs that offer a deeper understanding of the business may be re-reported, or an existing KPI's calculation may be altered. Although the selection of KPIs is not fixed in stone, it is important to clearly explain any changes to the KPIs, their nature, and the methods used to measure and report them. The following are 12 recommended steps for initiating the implementation of KPIs: (Barr 2014, 5)

Step 1: Choose a goal you really want or need to achieve.

Step 2: Make your goal measurable by teasing out the performance result it implies.

Step 3: Use sensory rich language to describe your result.

Step 4: Choose potential measures that give evidence of your result.

Step 5: Evaluate your potential measures and select the most meaningful one.

Step 6: Name and describe your selected measure.

Step 7: Define exactly how to calculate your measure's values.

Step 8: Get the data and make it ready for analysis.

Step 9: Calculate your measure's values.

Step 10: Choose the presentation method that best highlights your measure's message.

Step 11: Interpret what your measure is saying and understand why it's saying that.

Step 12: Make a decision and take action to move closer to your goal.

### 2.1.2 How many KPIs?

Presenting various performance metrics to the audience without clarifying the ones that hold utmost significance in managing their enterprise fails to promote transparency. As previously indicated, the determination of which indicators are deemed essential is contingent upon the distinct characteristics of each organization and its strategic objectives. Consequently, it is not feasible to prescribe a definitive number of key performance indicators that a company ought to possess. Nevertheless, it

is probable that a majority of company types will require a range of four to ten measures that are essential. (Marian 2017, 5)

### 2.1.3 Group or segment KPIs?

The aggregation and internal reporting of KPIs should be considered by management. Whether the aggregation and reporting of KPIs at the level of the group is logical or whether it would be more advantageous to report KPIs at the level of the business segment should be evaluated by management. When certain conditions are met, it may be preferable for KPIs to be presented for individual business segments instead of aggregating them, as the resultant outcome may lose its significance. (Marian 2017, 5)

### 2.1.4 KPI usages

KPIs facilitate progress in various business domains, including sales, marketing, and finance. The following are three potential use cases for employing KPIs:

#### **Sales**

KPIs for sales are quantitative measures that are used to evaluate the effectiveness and productivity of both the sales staff and the sales division as a whole. The ability of a sales executive to generate a predetermined number of monthly sales bookings or opportunities is one metric that could be used to evaluate the effectiveness of the executive's performance. It is possible to evaluate the effectiveness of a sales manager based on the total volume of sales produced by the team under their supervision. It is of the utmost importance to keep a close eye on specific KPIs in sales, such as the number of Sales Qualified Leads (SQLs) and the number of onboarding and demo calls that are scheduled on a monthly basis. The call volume that can be attributed to each sales representative, the sales that can be generated by each sales representative, and the average cost that can be incurred when acquiring a lead are the metrics that are of interest. (Ozuysal 2022)

#### **Marketing**

Marketing KPIs are employed to track the Return On Investment (ROI) of marketing initiatives. The evaluation of the effectiveness of marketing campaigns and initiatives in generating leads or customers can be achieved through the monitoring of KPIs. For instance, it is crucial for an e-commerce enterprise to be aware of its Customer Acquisition Cost (CAC). The metric pertains to the costs associated with acquiring a new customer. The marketing department has expertise concerning the allocation of funds for advertising with the aim of acquiring customers. The essential performance metrics that require monitoring in the field of marketing encompass the Return On Investment (ROI) of digital marketing, the proportion of leads that successfully transform into customers, the conversion rate on landing pages, and the Return On Ad Spend (ROAS). (Ozuysal 2022)

## Customer

KPIs pertaining to customers can offer significant insights into the performance of a product and the overall customer experience. In modern times, ensuring customer satisfaction is of utmost significance. The underlying reasoning for this proposal is that businesses rely on customers as their main source of income, thus validating their importance in the context of utilizing products or services. Monitoring KPIs pertaining to customers can aid in the understanding of customer segments that exhibit dissatisfaction with a product as well as the underlying reasons for such discontent. Likewise, employees have the option to create a system for soliciting feedback from their personnel in order to evaluate their degree of satisfaction. (Ozuysal 2022) The subsequent KPIs are suggested for monitoring and evaluating customer behavior:

- Average response time
- Customer Lifetime Value (CLV)
- Net Promoter Score (NPS)
- Bounce rate
- Customer Effort Score (CES)

## 2.2 Currently existing indicators

There are 73 essential manufacturing metrics and KPIs. (Jenkins, 2022) (See Appendix 1.) A range of four to ten metrics is what most companies use in their operations.

Broadly speaking, there exist two distinct categories of business metrics.

- Operational metrics pertain to the workforce's productivity and the overall effectiveness of the enterprise. The aforementioned factors may have a correlation with your time, production duration, and responsiveness to customer inquiries.
- Financial metrics include various indicators such as profitability ratios, return on investment (ROI) for marketing campaigns, and sales figures.

Due to the increasing prevalence of industry-specific terms, it is more important than ever to provide clear definitions of performance indicators to ensure that readers fully grasp the concepts being measured and can make meaningful comparisons between companies operating within the same sector.

**Question 4.** How can work efficiency be improved with the help of metrics?

The lack of established criteria for gauging various industry-specific metrics, coupled with the prevalence of proprietary metrics employed by numerous companies, underscores the importance of elucidating the constituent elements of a metric and the methodology for its computation.

Understanding how effectively a process is operating, identifying areas for improvement, and ensuring that desired objectives are being met all depend on measuring process performance. Analyzing

quantitative data, such as how much time or money it costs to complete particular tasks, can be used to achieve this. Alternative sources of information about how well a process is working include qualitative data like customer and employee feedback. In the end, the particular processes in question will determine how to measure process performance. Businesses can strategically improve process performance and produce better results by using the appropriate metrics and methodologies for each specific situation. (Lynch 2018)

The following discourse pertains to the prevalent metrics, also known as KPIs, utilized in manufacturing industries, and an answer to the fourth inquiry.

### 2.2.1 OTD

The On-Time Delivery performance indicator is utilized to evaluate the efficacy of the supply chain. Significant importance is held by the KPI in question in evaluating the performance of carriers and upholding customer satisfaction. This metric is used to measure whether or not the promised delivery timelines are being successfully adhered to by the organization in achieving its objectives.

The prompt delivery of goods or services is considered a crucial factor by customers when assessing the quality of their delivery experience, thereby constituting a vital aspect of customer retention. Dissatisfied clientele may be caused by reduced levels of punctual delivery, which could lead to refraining from making future purchases, heightened grievances from customers, increased customer service inquiries, and subsequent expenses for your organization.

On-Time Delivery (OTD) =  $\text{On-time units delivered} / \text{total delivered units}$

The measurement of on-time delivery can be achieved through various means using KPIs. The average on-time delivery rate is considered the most straightforward metric. In order to calculate a certain metric, it is necessary to have access to both the total number of deliveries and the number of late deliveries. The process of dividing can be executed once the numbers are obtained. This chapter presents the OTD metric for the current month, which stands at 98%. The metric is based on a sample of 1,000 deliveries, out of which only 17 were delayed. A 90% OTD metric can be achieved if 100 out of the total number of items are tardy. (Dalin-Kaptza 2021)

### 2.2.2 OEE

The metric commonly used to evaluate manufacturing efficiency is OEE (Overall Equipment Effectiveness). Stated differently, the metric indicates the proportion of manufacturing time that is effectively utilized for production purposes. An OEE score of 100% signifies that the production process is yielding exclusively high-quality parts at maximum efficiency, with no instances of downtime. In the OEE terminology, the statement denotes complete adherence to three key performance indicators, namely Quality, Performance, and Availability, each of which is quantified at 100%. Quality signifies the presence of only good parts, Performance denotes the maximum possible speed, and Availability indicates zero downtime.

Measuring OEE is considered a crucial best practice in the manufacturing industry. The course will provide valuable insights on the systematic improvement of manufacturing processes through the utilization of OEE measurement and identification of underlying losses. The best metric for pinpointing inefficiencies, gauging development, and raising manufacturing equipment productivity (i.e., reducing waste) is OEE. (Jonsson and Lesshammar 1999)

$$\text{OEE} = (\text{Good Count} \times \text{Ideal Cycle Time}) / \text{Planned Production Time}$$

Overall Equipment Efficiency means to use machines up to the limit and with minimal resources. The OEE metric provides an indication of the current operational status, while the three fundamental components that comprise it, namely Availability, Performance, and Quality, serve as key indicators to direct improvement initiatives.

**OEE AVAILABILITY:** The ratio of run time to planned production time is known as OEE availability. The concept of availability includes availability loss, which is any incident that prevents planned production for a significant amount of time (typically several minutes, long enough for an operator to log a reason). Unplanned stops (like equipment breakdowns and material shortages) and planned stops (like changeover times) are a few examples of things that result in availability losses. The incorporation of changeover time in OEE analysis is due to its potential impact on manufacturing productivity. Changeover time can usually be greatly reduced, even though it may not always be possible to completely eradicate it. SMED's (Single-Minute Exchange of Die) main objective is to shorten changeover times. Run time is the amount of time that remains after availability loss has been deducted.

**OEE PERFORMANCE:** OEE performance accounts for performance loss, which includes both slow cycles and small stops, and is anything that prevents the manufacturing process from operating at its maximum speed when it is in operation. Wear and tear on the machine, inferior materials, incorrect feeds, and jams are a few examples of factors that affect performance. Net run time is the time that remains after performance loss has been taken into account.

**OEE QUALITY:** Quality loss, which accounts for manufactured parts that don't meet quality standards, is taken into account. Scrap and components that require rework are two examples of things that reduce quality. In the same way that first pass yield defines good parts as those that successfully complete the manufacturing process the first time without requiring any rework, OEE Quality defines good parts in the same way. Fully productive time is the amount of time that remains after quality loss has been taken into account. (Vorne, Inds OEE, 2018)

### 2.2.3 VAPP

The Value Added Per Person is a financial metric that pertains to the number of direct laborers who are involved in the process of adding value to the final product.

The VAPP metric measures the efficiency of human resources in converting raw materials into the final product, thereby influencing the overall process expenses.

- The input value refers to the value of the raw material unit before the commencement of production.
- The output value refers to the monetary worth of the unit post-production.
- Direct employees refer to individuals who are essential for the operation of the production process.

$$\text{Value Added Per Person} = (\text{Output Value} - \text{Input Value}) / \text{Number of Employees}$$

The maximum difference between input and output values can be achieved by controlling the production process with the VAPP measure. The difference between the final value of the finished product and the value of the raw materials and services used is reflected in the output and input values. Incorporating downstream or upstream processes into the cell or factory while keeping the same number of direct employees would be an example of a VAPP improvement. (MBA Skool Team, 2016)

#### 2.2.4 PPM

Part Per Million: Lean Six Sigma frequently uses PPM, or parts Per Million, to gauge and assess process performance. It is used to count the number of flaws in a process at any given time. PPM can assist companies in locating and eliminating wasteful practices boosting productivity, and putting in place continuous improvement procedures that will have a long-term effect on their bottom line. Businesses that comprehend this metric can use it to pinpoint areas of excellence and areas for development, ensuring that they consistently meet customer expectations and provide high-quality goods and services. (Lynch, A. 2018.)

PPM is a way to quantify how many flaws there are in a process or product. You must first determine the number of opportunities for a defect and then divide that number by the quantity of units produced in order to calculate PPM. For instance, your PPM would be 10 (100/1,000) if your process had 100 opportunities for defects and you produced 1,000 units. Your process is more effective and efficient with a lower PPM. (Lynch 2018)

#### 2.3 KRA

A structure known as a Key Responsibility Area (KRA) outlines the function of a specific job profile. KRAs list the ideal outcomes anticipated of workers, teams, and the entire organization. They give employees a sense of direction and assist them in understanding their roles. (Ozuysal 2022) The following elucidates the significance of KRAs in ensuring the prosperity of an organization.

- **Evaluates Employee Performance:** The utilization of an exceptional performance management approach can facilitate the equitable evaluation of employee performance. It is possible to assess whether individuals are fulfilling their duties and whether the outcomes align with the intended objectives.
- **Ensures Time Efficiency:** The Pareto principle is employed by KRA, whereby it is posited that 80% of outcomes are driven by 20% of activities. By prioritizing the essential duties that lead to desired outcomes, personnel can optimize their time management and enhance their overall efficiency.

- **Helps with Resource Management:** Clarity in defining roles enables organizations to optimize resource allocation. Following the monitoring of KRAs, organizations can gain enhanced insight into the requisite number of new personnel, the specific technological or software requirements of employees, and the potential training materials necessary to initiate operations.
- **Improves Employee Engagement:** KRAs facilitate employees' comprehension of a broader perspective of how their job responsibilities contribute to the overall success of the organization. Moreover, KRAs have the potential to be customized to suit the individual needs of employees, thereby instilling a sense of independence in determining the means by which they can attain personal success within the organization.

### 2.3.1 KRA usages

Acquiring knowledge about KRAs is a crucial aspect, however, the ability to effectively execute them is equally significant. Below are several scenarios that demonstrate effective methods for communicating KRAs to employees. (Ozuysal 2022)

- **Onboarding:** Upon being employed for a particular position, an employee typically exhibits a proclivity towards acquiring an understanding of the job requirements and identifying strategies for achieving success in their assigned role.  
The utilization of KRAs in establishing appropriate strategic objectives facilitates effective communication of pertinent information to potential candidates by recruiters, while also ensuring unambiguous delineation of performance expectations.
- **Check-Ins or Team Meetings:** The opportune moments to offer feedback are during check-ins and team meetings. When managers involve employees in goal setting, there is a significantly higher level of engagement and productivity among those employees compared to their counterparts who are not involved in the goal-setting process.
- **Use Software:** It is feasible for software to efficiently store and manage a comprehensive record of the KRAs of every employee. It is possible to customize the performance management objectives for individual team members and conduct a precise assessment of their performance over a period of time. The objective of formulating KRAs is to ascertain the raison data of each role within every department. This practice is also employed to address inquiries such as the rationale behind the employment of each position and staff member within the organization.

By utilizing KRAs effectively, it is possible to identify the essential outcomes that each employee must attain. Subsequently, a comprehensive inventory of critical duties required to accomplish each outcome can be established. (Ozuysal 2022)

### 2.3.2 KPI vs. KRA

Key Performance Indicators (KPIs) and Key Responsibility Areas (KRAs) are both crucial components that contribute significantly to the overall success of an organization. The mutual reinforcement of



individual strengths facilitates the achievement of collective objectives by the team. Presented below is a comprehensive enumeration of the fundamental distinctions between the two. (Ozuysal 2022)

- **Definition:** KRAs delineate the extent of the job function, specifying the outcomes that the position is required to deliver. Subsequently, pivotal duties can be designated to attain the objective. KPIs are utilized to gauge an employee's advancement towards their KRA. It is noteworthy that KPIs are quantitative, measurable metrics, whereas KRAs are qualitative.
- **Process:** KPIs cannot be established in the absence of a well-defined objective. KRAs are instrumental in this regard. KRAs are strategically aligned with the objectives of the organization. Every employment role holds a crucial role in accomplishing the organizational mission and vision. KPIs are utilized to monitor and evaluate the advancement of an employee or customer in relation to a predetermined KRA. Thus, it is imperative to prioritize KRAs when establishing organizational objectives.
- **Measurability:** KRAs pose a challenge in terms of measurability, thereby necessitating the use of KPIs for businesses. An instance of subjectivity may arise in the case of a sales manager who has been assigned a KRA pertaining to the development of a proficient sales team. The KPI that assesses the increase in sales and overall sales figures provides insight into the progress of the sales manager's team. The same applies to manufacturing teams. KRAs are essential, as the incorrect allocation of KPIs can result in inaccurate results. It is imperative to establish achievable KPIs and limit their number to a few. This practice aids in maintaining the concentration of employees solely on the essential metrics that are instrumental in achieving desired outcomes.
- **Structure:** It is possible to allocate several KPIs to a singular KRA. However, the converse is not necessarily valid. A marketing manager who is tasked with achieving a successful marketing campaign may assign various KPIs to gauge the effectiveness of the campaign. As an illustration, it is plausible for them to monitor various metrics such as conversion rate, profit margin, cost per customer acquisition, number of new leads or customers, and so forth. At times, a solitary KPI may not provide a comprehensive narrative. For instance, a website may experience a substantial number of visitors but a minimal number of conversions. This implies that there may be an issue with the KPI for conversion rate.
- **Timeline:** KRAs are commonly regarded as the benchmark that a particular job function aims to attain. The assessment has been designed to serve as a periodic evaluation that spans a considerable period of time, typically on a quarterly or annual basis. This is due to the infrequency of changes in the job scope on a monthly basis. KPIs have the potential to be easily modified on a monthly basis in response to changing circumstances. Regarding this aspect, KPIs exhibit greater flexibility. An instance of budget reduction, albeit minor, can have a significant impact on marketing expenditure, thereby resulting in a modification of all the KPIs.
- **Basis:** KRAs are formulated in accordance with the missions and aspirations of an organization. They are formulated in accordance with the overarching strategic objectives of the organization. An organization that prioritizes customer service would establish KRAs that are associated with guaranteeing customer contentment. KPIs are typically designed to be in

line with the overall mission of a company. However, it is not uncommon for KPIs to undergo modifications based on previous performance outcomes. KPIs are subject to frequent adjustments, which may be influenced by various factors such as an employee's historical performance, quarterly objectives, resource allocation, and other relevant considerations. Finally, KRAs delineate ambitious and daring strategic objectives, whereas KPIs serve as performance measures that every employee must achieve. KPIs are instrumental in attaining the intended outcome.

KRAs and KPIs are interdependent and serve as crucial factors for achieving success in any business. By establishing well-defined objectives for each role, it is possible to develop KPIs that can be utilized to gauge advancement towards these quantifiable targets. However, the mere act of formulating KPIs and KRAs does not suffice. A suitable instrument is required to monitor them effectively. (Ozuysal 2022)

### 3 BUSINESS TRANSFORMATION

The process of business transformation is long and difficult. It is an effort to address the biggest challenge facing today's business leaders. how to maintain competitiveness in the face of numerous internal and external triggers. Although management consultants and strategy writers frequently use the term, there is a lot of misunderstanding regarding what business transformation actually entails. This chapter examines the various ways the term has been used in academic and professional writings, sorting through the confusion of usage and hype. The various business transformation approaches are defined in a two-dimensional framework that develops around the crucial questions of the nature and scope of strategic change in order to facilitate meaningful discussion towards the shared objective of increasing organizations' competitiveness in the current dynamic market space. Within this framework, continuous business transformation is understood as a strategy for achieving a new state through small, evolutionary steps as opposed to radical change. (Ashurst, C., & Hodges, J. 2010. 217–237) Because it never stops and takes place within the organization's current paradigm, it aids in the organization's acceleration, momentum-building, and impact-delivery. However, a strong organizational structure and winning strategy must support the execution for it to be successful. (Messner 2017)

Most modern institutions prioritize operational efficiency more than strategic agility. After the initial phase of their business venture, they experienced a decrease in their ability to take advantage of favorable opportunities and manage potential risks. When faced with a potential opportunity or a potential risk in a new market, people may try to initiate a major business transformation by using a proven change methodology that has worked in the past. Contemporary challenges indicate that traditional approaches to formulating, executing, and leveraging strategy are insufficient. (Kotter 2012, 43)

Previously, companies infrequently assessed, modified, and adjusted their strategies. The products and services offered, customer segments, hierarchical structures, and organizational processes were all firmly established. The current business environment is undergoing frequent and swift changes.

The pace of change is constantly accelerating. The marketplace is currently experiencing a wide range of triggers that are both numerous and intense. These triggers are causing a significant transformation in the business world, making it a top priority for companies to address. The primary trigger of transformation is often perceived to be changing customer demand. In order to satisfy customers, companies must continuously innovate and improve their products or services. This may involve anticipating customer needs and proactively developing breakthrough solutions. (Kotter 2012, 7) (Moreno 2014)

### 3.1 Organizational hierarchy and workflow optimization

In virtually every organization, there is a hierarchical structure that delineates job responsibilities and levels of authority. The impact of an organization's hierarchy on project success, productivity, and communication is a significant area of concern. Acquiring comprehension of the structure of your organization and generating recommendations for structural modifications, if necessary, can be achieved through an understanding of organizational hierarchies. This chapter provides a definition of organizational hierarchy, outlines the common members of such hierarchies, elucidates the significance of hierarchies, and discusses the typical types of hierarchical structures.

The membership hierarchy based on authority refers to the organization of members. This hierarchy encompasses individuals ranging from entry-level employees to senior managers or executives. Organizational hierarchies are commonly structured with multiple tiers, wherein individuals occupying higher positions wield greater levels of authority. The highest-ranking individual in a company's hierarchy is typically the Chief Executive Officer (CEO). If one holds a leadership position within a company, it may be beneficial to restructure the hierarchy in order to optimize the flow of communication and reporting. (Shuler 2021)

The people listed below are notable figures in organizational hierarchies:

- The individual occupying the highest-ranking position within an organization, commonly referred to as the chief executive officer (CEO), is responsible for providing direction and guidance to the company in order to facilitate growth, profitability, and development.
- The Chief Operating Officer (COO) is responsible for overseeing and coordinating organizational activities to ensure optimal efficiency and productivity within the company.
- The Chief Financial Officer (CFO) is responsible for coordinating all financial activities within an organization, including the identification and recommendation of potential financial opportunities such as investments.

It is the responsibility of directors to oversee various departments and ensure that departmental managers, including those in charge of financial, sales, and marketing operations, implement optimal procedures to enhance productivity. Departmental managers are responsible for overseeing the day-to-day activities of an organization and imparting training to the staff members working within their respective departments. It is recommended that department supervisors provide assistance to department managers in the planning of daily activities. (Ashurst, C., & Hodges, J. 2010)

### 3.1.1 Workflow

Tasks and workflows are two distinct types of work that are completed in any organization. An employee moves on to the next task after finishing a single assignment known as a task. A workflow is a set of actions that must be taken, typically repeatedly, in order to complete a task. Workflows in small businesses are typically fairly linear. However, these workflows get more complicated as a business expands. They are able to spread out and even change into a web of connections.

The concept of "workflow" can be defined in a comprehensive manner as a sequence of activities that are arranged in a chronological manner to form processes, and the personnel or resources that are necessary to execute those activities with the aim of accomplishing a particular goal. The workflow of an organization is constituted by a collection of procedures required to be executed, the available human resources or other resources to carry out those procedures, and the interrelationships among them.

Workflows impede effective scaling and complicate business operations. Growing a business would be simple if operations followed a straight line. Instead, they spread out like a dense web of connections. That web's threads each represent a crucial workflow. However, what precisely is a workflow? And how can your workflows be enhanced to maximize profits while minimizing time and financial outlays? Nevertheless, this goes beyond cost reduction and employee efficiency. How can you cut costs while increasing efficiency in your business? Your business could fail if you are unable to recognize workflows and spot opportunities for improvement. (Ellermann 2017)

### 3.2 Top-down and bottom-up approaches for better strategies

The management of business does not have a universally applicable approach. It is recommended to conduct a comprehensive assessment of one's methodology in the event of recurrent hindrances in achieving strategic goals. In order to improve the effectiveness of the approach, it may be beneficial to integrate a higher quantity of either top-down or bottom-up initiatives. Having a thorough comprehension of the present condition of the organization and detecting any inadequacies is of utmost importance. The aforementioned procedure displays resemblances to a gap analysis, albeit with a specific emphasis on the organizational framework. (Daniels 2010)



Figure 1. Strategy nucleus. (Alonso, 2022)

### **Organizational Design: Why Does It Matter?**

As per the prevailing notion, it is recommended that a corporation's organizational structure is to be established prior to the development of its strategic plan. The impact of the organizational structure of a company on employee communication is a significant factor to consider. Consequently, the optimal arrangement of an organization should align with the company's overarching goals and mission.

Since every enterprise has its own unique vision, goals, and assets, a universally optimal design does not exist. Every organizational strategy possesses certain benefits that facilitate certain tasks, while simultaneously presenting certain drawbacks that impede certain activities. The strategy selection mirrors the priorities of the organization. This chapter discusses the two primary approaches to strategic management. The top-down approach and the bottom-up approach. (Alonso, 2022) Additionally, it will examine the circumstances under which each approach is most suitable. These pertain to the manner in which an entity manages data and structures its understanding. The information flow within an organization's hierarchical structure is also a matter of concern.

#### **3.2.1 Top-Down Approach**

The top-down management approach is a leadership model that businesses may opt for, which is essentially characterized by an autocratic style of leadership. The decision-making process is primarily concentrated within the upper echelons of management, with minimal involvement or contribution from employees in terms of input or feedback. Subsequently, the determinations are conveyed in a downward direction. (Tsai & Beverton, 2007)

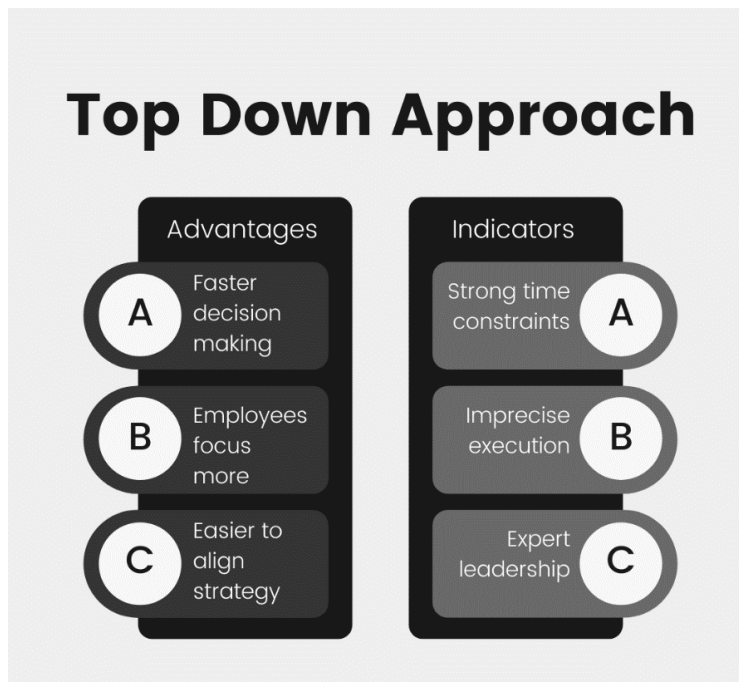


Figure 2. top-down approach. (Alonso, 2022)

The utilization of a top-down approach has been shown to provide advantages, including the ability to expedite the decision-making process. Employees exhibit a higher level of concentration. The alignment of strategies is a relatively straightforward process. (Alonso, 2022)

The initial impact of a top-down approach pertains to the decision-making process. The prompt posits that the presence of an organizational leader who is responsible for all major decisions can expedite the process of problem diagnosis and solution implementation. The decision-maker's proficiency obviates the necessity for input and feedback from the remaining team members, resulting in time and cost savings, and facilitating the implementation of the strategy.

The second impact pertains to the productivity of the labor force. The removal of decision-making responsibilities enables employees to focus on execution. They are free from the weight of decision-making pressure. Their sole concern lies in the execution of the plan. It could be contended that this constitutes a clandestine approach to enhancing productivity.

The third effect holds utmost importance and pertains to the alignment of strategy. The comprehension of a company's strategy is facilitated under the leadership of an autocratic individual, as it ensures that each employee is cognizant of their respective position and responsibilities within the organizational structure. (Tsai & Beverton, 2007)

### **Under what circumstances is it appropriate to employ a top-down approach?**

There is a stringent time constraint to be fulfilled.

During periods of emergency or exceedingly constrained timelines, the principles of democracy are often disregarded. The relevance of justifying a plan becomes insignificant when the consequences of not taking any action outweigh the potential negative outcomes of making a suboptimal decision. The act of carrying out a task or plan becomes highly significant.

It is imperative to execute the task with precision.

Executing a mediocre decision with perfection is superior to executing a perfect decision with mediocrity. In certain circumstances, it may be more advantageous to take action rather than delay, even if the chosen course of action is not optimal. Subsequently, it is necessary to make a submission.

An individual in a position of leadership possesses a high level of expertise and proficiency in their respective field.

Autocratic leadership can be highly effective when the individual in a position of authority, such as a team leader, possesses a notably greater level of expertise than the other members of the group. An individual who owns a small business may possess several years of expertise in their respective industry. The individual possesses expertise in their craft and exhibits a keen understanding of effective and ineffective practices. (Daniels 2010)

### **Disadvantages of top-down approach**

Individuals with unpleasant personalities are generally not well-liked. The act of exercising authority need not necessarily be derogatory. It is important to differentiate between confidence and arrogance. The utilization of impoliteness, a sense of entitlement, and verbal abuse can rapidly lead to a culture that is detrimental. (Alonso, 2022)



Figure 3. Disadvantages of top-down approach. (Alonso, 2022)

- Possible abuse: Individuals generally hold negative attitudes towards individuals who exhibit unpleasant behavior. Assuming a position of power does not necessarily entail experiencing humiliation. The attribute of confidence ought not to be confused with that of conceit. The manifestation of a negative culture can be accelerated by behaviors such as impoliteness, a

perceived sense of entitlement, and the use of derogatory language. It is recommended to exhibit compassion. Maintain a high level of stringency while refraining from making evaluative statements. It is important to refrain from diminishing or reproaching individuals.

- **Underqualified leadership:** In situations where questioning decisions is not feasible, the business adheres solely to the directives of its highest-ranking management personnel. What if their understanding is incorrect? Even experienced individuals are prone to errors. It is recommended that one engage in self-inquiry by posing questions to oneself. In the event that aid is needed, it is advisable to request it. One should avoid constraining their viewpoint based on previous experiences. Objective judgement is required in situations where there are unforeseeable changes or novel circumstances.
- **Toxic culture:** Emergencies do not always occur. It is advisable to allocate a specific period to elucidate the objectives and overarching goals of the plan. In order to comprehend their place within a given context, individuals may require only a limited amount of information regarding their fundamental motivations. The principle of fairness is deemed essential. The practice of exhibiting favoritism without regard for necessity can foster disloyalty. It is advisable not to disregard concerns, especially those that arise repeatedly. Act with bravery and fairness.
- **Unrealistic plan:** Persistent disregard of feedback leads to a state of detachment from actuality. The efficacy of plans is contingent upon their successful implementation, rendering even the most well-crafted strategies futile if they cannot be executed. It is advisable to maintain a flexible approach in the event that the system fails to perform optimally. Additionally, it is crucial to ensure that the system is appropriately designed, which includes aligning incentives, providing sufficient training, and offering support. Maintain communication with those at the forefront of the situation. Acquire a comprehensive comprehension of the aspects that operate effectively and those that do not.
- **Absence of delegation:** It is imperative for the leader of an organization to delineate the overarching vision and set clear performance standards. Individuals in positions of high authority bear the responsibility of ensuring that the overarching vision remains consistent as they formulate the fundamental tenets and the unified plan of action. It is not imperative to make a decision on every minute detail. It is advisable to maintain a straightforward approach to one's principles. Discuss strategies without delving into underlying principles. When faced with the need for organization, one should not hesitate to assign tasks to others.



### 3.2.2 Bottom-Up Approach

Bottom-up management is a leadership approach that is characterized by a relatively flat organizational structure and is commonly adopted by businesses. The involvement of employees in the decision-making process is more pronounced, and there is a frequent sharing of feedback at the upper echelons. (Jagoda, K., Lonseth, R., & Lonseth, A. 2013)

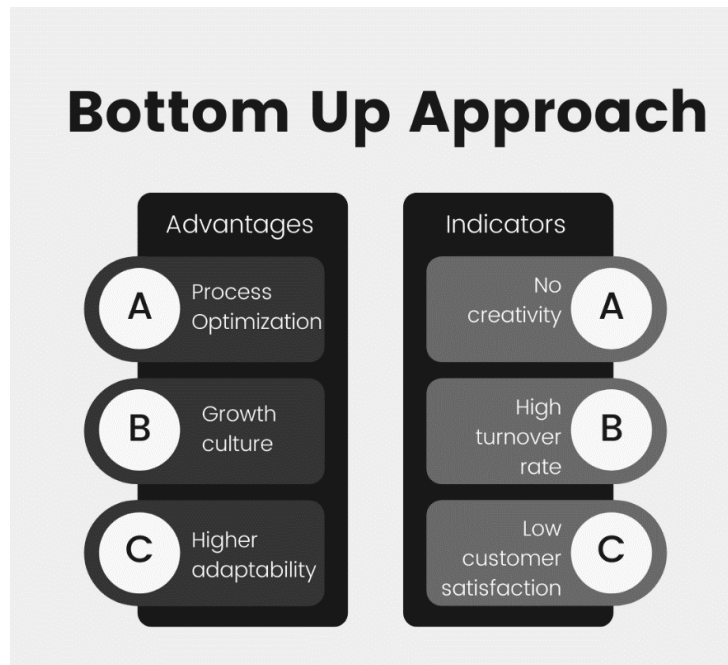


Figure 4. Bottom-up Approach. (Alonso, 2022)

#### **Advantages of bottom-up approach**

The following points briefly show the benefits of using the bottom-up strategy: (Alonso, 2022)

- **Process improvement:** The effects of a bottom-up strategy are initially demonstrated in process optimization. The utilization of specialized skills possessed by front-line staff members is employed. Individuals have the ability to offer their unique perspective and specialized knowledge through active participation in the process of making decisions.
- **Culture of growth:** The improvement of customer responsiveness is positively correlated with an increase in productivity. The encouragement of experimentation fosters process improvement. The culture represents the secondary impact. The perception of being listened to is experienced by all individuals. Individuals experience a sense of empowerment when they perceive that their contributions are meaningful, which motivates them to take the initiative and devise solutions. The organization fosters a culture that prioritizes expansion and embraces openness. The aspiration to cultivate and innovate attracts fresh abilities.

- Increased adaptability: The third consequence is one's ability to adapt. As a recipient of firsthand information from the operational level, one communicates environmental shifts, including those in the market and among competitors, to key decision-makers. In order to respond appropriately, it is necessary to obtain a precise understanding of the situation. It is imperative to ensure that one's reports are precise and evaluate the most significant factors.

### **When to use bottom-up approach?**

- There is need for creativity.

The presence of freedom and initiative is crucial in situations where innovation and creativity are deemed primary objectives. Leveraging individual expertise and unique perspectives can provide a plethora of opportunities for generating ideas and creating content. Every minor contribution has the potential to lead to a significant realization that can transform one's life.

- Turnover is high.

The recurrent need to recruit additional staff members is indicative of an unfavorable workplace atmosphere. Perhaps the inability to locate "loyal" and "hardworking" employees is not solely attributed to the new hires. Unjustifiable demands, inequitable conduct, and intentional utilization do not promote allegiance or a committed labor force. If an issue is not confined to a specific location, it may be overlooked or dismissed. Individuals make efforts to both engage in work and safeguard themselves. The hospitality or toxicity of a culture can be inferred from lagging indicators such as high performance and strict deadlines in the workplace.

- Many customers are unhappy.

The manifestation of inadequate customer service can be observed through repetitive grievances and the lack of repeat customers. The extent of decay is exacerbated when it is not possible to attribute the issue to an individual. The dissatisfaction of customers can be considered a symptom of the underlying issue. Although disreputable tactics may yield profitable outcomes in the near future, they can prove to be highly detrimental in the long run.

### **Disadvantages of bottom-up approach**

In situations where information is consistently and disorganized flowing, it becomes an insurmountable task to effectively categorize and analyze it. It is recommended to establish a standardized approach for providing upward feedback, utilizing a system that facilitates the generation of actionable insights. It is advisable to avoid receiving information that lacks structure, clarity, and a clear objective. (Alonso, 2022)



Figure 5. Bottom-up Disadvantages. (Alonso, 2022)

- **Overwhelming feedback:** The task of organizing incessantly flowing and unstructured information is deemed unattainable. Develop a standardized methodology for delivering feedback to superiors that incorporates a structured framework designed to promote the dissemination of valuable insights. It is advisable to avoid being affected by disorganized, unclear, or irrelevant data.
- **Increased complexity:** The bottom-up approach involves the processing of environmental data and the development of simple systems. The emergence of complexity occurs when multiple systems are integrated to generate practical outcomes. It is recommended to establish comprehensive guidelines and policies. However, it is advisable to refrain from making alterations to certain exceptions. These issues can be addressed without increasing the level of complexity. It is advisable to refrain from attempting to scale the object or system in question. The process of scaling necessitates a certain level of user-friendliness.
- **Poor individual performance:** Horizontal organizations are reliant on competent and motivated individuals at the operational level. It is advisable to be mindful of individuals who provide support and assistance to the business. It is important to provide clear and concise instructions and guidance. It is advisable to exert a deliberate effort in order to carefully choose the most suitable candidates. Individuals possess the capacity to either make the most advantageous choice or have the most detrimental experience in their lives. Enhancing operational processes can lead to the success of small enterprises. However, for enterprises of greater magnitude, this represents only a partial resolution.

- **No competitiveness:** It is suggested that individuals focus on advanced disciplines that have the potential to yield future benefits, without being constrained by present-day demands. It is unwise to disregard modifications that are targeted at prospective customers.

### 3.2.3 Top-Down vs. Bottom-Up Approach

The imposition of a rigid hierarchy may lead to the demise of a culture. The exclusive focus on process optimization precludes the possibility of achieving competitive breakthroughs. It is seldom advisable to pursue a singular strategy in life. The optimal arrangement of organizational components and effective management practices are focused on. A potential solution to enhance the performance of your company could be to appoint a proficient leader who possesses comprehensive knowledge of the market as well as their respective fields. It may be advisable to provide employees with increased autonomy, reduce micromanagement practices, and offer enhanced incentives. As previously mentioned, the configuration of the enterprise is established by its strategic approach. To be candid, that notion is antiquated and belongs to a bygone era. The actual scenario is likely to be more intricate. The development of an optimal organizational framework, encompassing its decision-making protocols and staff composition, is a non-linear undertaking. (Alonso, 2022)

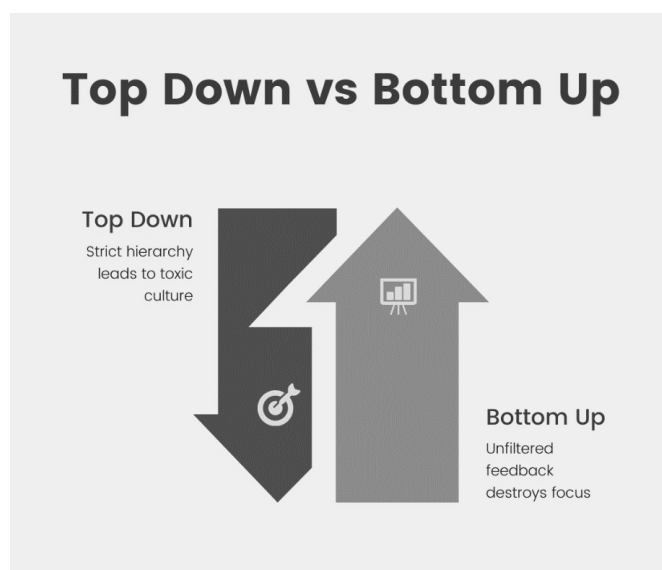


Figure 6. Top-down Vs Bottom-up. (Alonso, 2022)

The iterative strategy refers to a methodical approach that involves repeating a process or task multiple times, making incremental improvements with each iteration. This approach is often used in various fields, including software development, project management, and design, to refine and optimize a product or process. The iterative strategy is characterized by its flexibility and adaptability, allowing for adjustments to be made based on feedback and results obtained from each iteration. The organizational structure undergoes regular evaluations, and the possibility of questioning its efficacy is acknowledged. The edifice is of a transitory nature, lacking permanence, and necessitates the ability to expeditiously conform to novel exigencies and alterations in the surroundings. It is imperative for individuals to comprehend the significance of certain matters. The company consistently communicates, whether by choice or otherwise. (Alonso, 2022)

Which individuals serve as role models for promotion within your organization? What precisely is being assessed and incentivized? Does information flow in only one direction? In what direction does it exhibit a proclivity, and what impact does this inclination have on the cultural milieu? Does a sense of belonging exist? Do the leaders exhibit traits of empowerment and inspiration, or do they solely rely on issuing directives? What is the subject of people's training? What are the incentives for participation? These inquiries focus on the comprehensive strategy and organizational structure of an entity. While altering the structure of a company can present difficulties, there are instances where it becomes imperative for the achievement of strategic objectives. However, arriving at a judicious decision is a complex process. (Alonso, 2022)

The main findings are as follows:

- The comparison between top-down and bottom-up approaches.
- Effective strategies entail accurate problem identification, a meticulously structured plan, and the synchronization of all individuals' actions with said plan.
- When an individual possesses expertise in their respective domain or is operating within a limited timeframe, a top-down approach becomes imperative for effective leadership.
- In situations where there is a dearth of contented employees and clients, and a greater degree of creativity is required, a bottom-up approach may be deemed necessary.

It is important to note that each strategy, including the mentioned approach, has its own set of advantages and disadvantages.

#### 4 DIGITAL TRANSFORMATION

The term "digital transformation" pertains to the application of digital technologies for the purpose of either generating new or modifying existing business processes, culture, and customer experiences. This is done in response to changing business and market requirements. The term "digital transformation" pertains to the act of envisioning and restructuring business procedures within the framework of the contemporary digital era.

It surpasses conventional responsibilities such as sales, marketing, and customer service. The process of digital transformation commences and concludes with the manner in which one conceptualizes and interacts with their clientele. The transition from traditional paper-based methods to modern digital tools such as spreadsheets and smart applications presents an opportunity to revolutionize business operations and customer engagement through the use of technology.

For nascent enterprises, it is unnecessary to establish business procedures and subsequently overhaul them. It is possible to implement measures to ensure the long-term viability of an organization from its inception. The utilization of stickies and handwritten ledgers for establishing a contemporary business in the 21st century is not a viable approach for long-term sustainability. Engaging in digital thinking, strategizing, and construction establishes a foundation for adaptability, versatility, and expansion. Numerous companies are reevaluating their actions as they initiate the process of digital transformation to ensure that they are aligned with their objectives. (Maheshwari 2019)

#### 4.1 Digitization

In previous times, enterprises maintained their documentation in hard copy format. Historically, business data was recorded in analogue format, either through manual inscription in physical ledgers or through typewritten documents. In the past, individuals were required to handle tangible materials such as papers, binders, photocopies, and facsimiles in order to gather or disseminate data.

With the widespread adoption of computers, many companies initiated the process of digitizing previously paper-based records into electronic formats. Digitization refers to the procedure of converting analogue data into digital format.

The digitization of information has facilitated its discovery and dissemination. However, businesses have predominantly continued to employ traditional analogue techniques in their utilization of digital records. Icons of file folders were incorporated into the design of computer operating systems to create a sense of familiarity and reduce the level of intimidation experienced by novice users. The exponential efficiency of digital data for businesses has been noted, however, the systems and processes utilized by businesses are still predominantly based on analog-era concepts pertaining to the discovery, dissemination, and utilization of information. (Wengler, S., Hildmann, G., & Vossebein, U. 2021)

#### 4.2 Digitalization

Digitalization refers to the utilization of digitized data to streamline and enhance established operational procedures. It is important to take note of the term "established" as used in the definition. The process of digitalization does not entail altering the manner in which business is conducted or establishing novel business models. The ability to access data instantly, as opposed to being confined to a physical archive, facilitates more efficient and effective progress towards one's goals.

Consider the aspect of customer service, be it in the context of retail, field operations, or a call center. The advent of digitalization has revolutionized the service industry by enabling swift and effortless retrieval of customer records through computer systems. Although the fundamental approach to customer service has remained unchanged, the efficiency of the inquiry handling process has significantly improved with the replacement of paper ledgers with computer screens or mobile devices. This modernized approach involves swiftly searching for pertinent data and providing a resolution, thereby streamlining the entire process.

With the advancement of digital technology, individuals have begun to conceive novel applications of business technology beyond mere acceleration of traditional processes. This marks the inception of the concept of digital transformation. The emergence of novel technologies has enabled the realization of novel possibilities and approaches. (Wengler, S., Hildmann, G., & Vossebein, U. 2021)

### 4.3 Digital Transformation

The phenomenon of digital transformation is altering the manner in which commercial activities are conducted and, in certain instances, engendering novel categories of enterprises. Digital transformation has prompted companies to reevaluate their operations, including internal systems and customer interactions, both online and offline. The inquiry pertains to the possibility of modifying processes to facilitate improved decision-making, transformative efficiencies, or enhanced customer experience through increased personalization. "Every digital transformation is going to begin and end with the customer, and I can see that in the minds of every CEO I talk to." Marc Benioff Co-CEO at Salesforce. (Benioff 2020)

Corporations from a variety of sectors are developing creative and effective strategies to take advantage of technological advancement in the modern era, which is characterized by widespread digitization. Netflix can be considered a prime example. At the outset, the organization operated as a mail-based distribution system and disrupted the conventional video rental sector. The widespread implementation of streaming video was facilitated by the advent of digital advancements. At present, Netflix engages in competition with traditional broadcast and cable television networks as well as production studios by offering a growing assortment of on-demand content at highly competitive rates.

The process of digitization has enabled the company to not only provide video content to its customers through streaming but also to acquire unparalleled knowledge regarding their viewing patterns and inclinations. The data is utilized to inform various aspects of the organization, ranging from the design of its user experience to the development of first run shows and movies at its in-house studios. The statement pertains to the practical implementation of digital transformation, which involves leveraging existing technologies to optimize business operations.

Comprehending the potential of one's technology is a crucial component of digital transformation. This statement implies that simply increasing speed is not a sufficient solution and suggests that alternative approaches should be considered. This pertains to the importance of assessing the true potential of technology and strategizing ways to optimize business operations and procedures in light of technological investments. (Maheshwari 2019)

Digital transformations have had a significant impact on the manner in which companies approach customer service. The traditional approach involved passively waiting for customers to initiate contact, either through physical presence or by dialing a toll-free number. The emergence of social media has transformed the nature of service delivery, akin to its impact on advertising, marketing, sales, and customer service. Forward-thinking enterprises adopt social media as an opportunity to expand their service provisions by engaging with clients on their preferred platforms.

Improving the operational efficiency of call centers and in-store service desks through the implementation of digital technology is undoubtedly commendable. Authentic transformation occurs when one examines all feasible technologies and contemplates how integrating them into their enterprise can enhance the customer experience. The advent of social media was not intended to supplant call centers, but it has emerged as an ancillary avenue and prospect for providing superior customer

service. Incorporating social media into one's service offerings is a noteworthy illustration of a digital transformation. (Wengler, S., Hildmann, G., & Vossebein, U. 2021)

However, why limit oneself to that extent? As previously stated, the concept of digital transformation prompts enterprises to reassess all aspects, including conventional notions of teams and departments. This does not necessarily imply the utilization of service representatives for executing marketing campaigns, but it may involve breaking down barriers among various departments. The integration of service and marketing can be facilitated through a digital platform that captures customer information, personalizes customer journeys, and directs customer inquiries to service agents, all of which can be encompassed within your social media presence.

#### 4.4 SOA transformation

Service-Oriented Architecture (SOA) is an architectural paradigm in software engineering that emphasizes the use of autonomous and self-contained services as opposed to a unified and indivisible design. As a result, this concept is also implemented within the realm of software architecture, whereby application components furnish services to other components via a network-based communication protocol. A service refers to a self-contained and distinct functional component that can be remotely accessed, acted upon, and updated in isolation. An example of this would be the retrieval of a credit card statement through an online platform. The SOA is designed to be vendor, product, and technology agnostic. (Eric, A. Marks, AgilePath Corp. 2004) (Pant, k. Matjaz B. Juric. 2008)

According to one of the definitions of SOA, the concept of service orientation involves a cognitive framework centered on services, service-based development, and the resultant service outcomes. A service possesses four distinct properties:

- The statement posits that a given business activity is characterized by its repeatability and predetermined outcome.
- The item in question possesses a self-contained nature.
- The service is designed as a black box for its consumers, implying that they are not required to possess knowledge of the internal mechanisms of the service.
- It is possible that it is comprised of additional services.

The utilization of multiple services in tandem, known as a service mesh, can offer the capabilities of a complex software application, which aligns with the fundamental principles of modular programming that SOA embodies. SOA is a software design approach that facilitates the integration of distributed software components that are separately maintained and deployed. The ability for components to communicate and cooperate over a network, particularly an IP network, is made possible through the implementation of technologies and standards. (Eric, A. Marks, AgilePath Corp. 2004)

SOA pertains to the concept of an Application Programming Interface (API), which serves as an interface or communication protocol among distinct components of a computer programme. The primary objective of an API is to streamline the implementation and upkeep of software. The SOA can



be regarded as the framework that facilitates the operation of a service, while an Application Programming Interface (API) represents the service itself. (Abounaga, Ahmed, and Pareek. 2012)

This is not a novel idea. The emergence of IT services as a distinct market can be attributed to the pioneering efforts of Electronic Data Systems Corp. The company's founder, Ross Perot, recognized that a significant number of IBM clients possessed substantial mainframe capacity but lacked the expertise to optimize its utilization. Presently, a wide range of business functions can be procured as services, encompassing human resources, customer relationship management, Enterprise Resource Planning (ERP), and manufacturing capacity. Undoubtedly, IT outsourcing has garnered significant attention in recent times, particularly with the emergence of the offshore outsourcing phenomenon. (Hentrich, C., & Zdun, U. 2016)

Currently, there is a services transformation underway, wherein internal departments are being tasked with assuming the role of internal service providers for their internal customers. This initiative aims to enhance business and customer focus as well as competitive performance and efficiency. In the event that performance metrics and operating efficiencies cannot be attained, outsourcing the function remains a viable option. Nonetheless, the implicit intimidation represents a potential drawback of the movement towards service transformation. The positive aspects that require emphasis will be the central point of our discussion for the remainder of this scholarly piece.

What are the advantages of undergoing a service transformation, and what strategies can be employed to accomplish it? The following is an exemplar enumeration of advantages associated with the service transformation model:

- To enhance business focus and alignment, internal departments are treated as service providers.
- The shift of attention from an internal departmental focus to a business and customer focus is observed.
- Enhances operational efficiency by aligning the functions of various departments with the overarching requirements of the business.

The provision of services is carried out in a consistent and dependable manner, with charges based on usage, akin to the billing structure of telephone or other public utility services. By prioritizing overarching business concerns and ensuring that internal operations are aligned with them, a greater business objective can be achieved. (Eric, A. Marks, AgilePath Corp. 2004)

#### 4.5 ERP as a part of the SOA system

ERP systems have been identified as the central component of effective data, information, and knowledge management, achieved through the integration of functional applications that span the entirety of an organization. The implementation of ERP systems is increasingly being utilized to provide support to businesses in the face of a dynamic environment characterized by declining market shares, intense competition, rising customer demands, and globalization. According to Davenport (Davenport, 1998), the implementation of ERP systems has become a significant area of investment

in information technology for large corporations. Despite significant investments and extensive adoption of ERP systems, several organizations are recognizing that the actual influence of these systems on management styles and practices is considerably lower than anticipated, particularly with regards to organizational integration (Beretta, 2002). The pursuit of enhanced utilization and performance of enterprise system resources has prompted a concentration on two primary domains: enhancements in the implementation aspects of ERP systems and business process improvements that prioritize process integration, automation, and optimization within the business blueprint of ERP.

After providing a foundational explanation, it is now possible to explore the advantages of Service-Oriented Architecture (SOA) and its potential integration with Enterprise Resource Planning (ERP) systems. The primary advantage that is given the most emphasis is the increased level of flexibility. The SOA is comprised of an intermediary service layer that is situated between the front-end, also referred to as the presentation layer or user interface, and the back-end, which is responsible for managing business logic and data storage. The provision of distinct services enables modifications to be implemented on the ERP system without requiring access to the source code and underlying logic. This enhances the flexibility of the software to conform to evolving business requirements.

SOA facilitates the ability of a system to accommodate the unique business processes of an organization without necessitating alterations to the source code. This feature enables businesses to upgrade their software instance with ease, without the need for extensive customizations. The utilization of SOA enables enterprises to recycle services or software modules in lieu of developing novel ones, thereby curtailing expenses and prolonging the lifespan of existing systems. Moreover, SOA facilitates the integration of various systems, thereby enabling enterprises to benefit from optimized workflows. Monolithic ERP systems are characterized by their inflexibility, which hinders the ability to make seamless modifications. (Lämmer, A., Eggert, S., & Gronau, N. 2008)

Large software platforms are known to impede flexibility and create information silos, which can result in slower processes and inadequate support for collaboration and visibility. In contrast, service-orientation enables the dissemination of information across an organization. This outcome is a consequence of the level of service granularity exhibited by the software. The utilization of SOA enables the provision of services that are finely grained, thereby facilitating the decomposition of high-level business functions into discrete services. The level of detail in the approach facilitates cooperation and seamless integration of operational workflows. The utilization of SOA provides manufacturers and distributors with a significant degree of flexibility and transparency, which is of great value.

#### 4.6 KPIs in digital transformation

Undertaking digital transformation is a crucial initiative for companies seeking to maintain competitiveness in the contemporary digital era. The efficacy of transformational endeavors can be challenging to ascertain in the absence of adequate monitoring and evaluation. It is crucial to monitor a diverse range of KPIs in order to verify the attainment of a favorable Return On Investment (ROI) and streamline work processes through digital transformation.

The study revealed a range of KPIs that are pertinent to digital transformation and which organizations should track in order to ensure the effectiveness of their digital transformation efforts. What is the influence of said metrics on the optimization of workflow? The rationale behind initiating the transformation is a crucial determinant to start with to answer the questions. Each organization adopts a unique approach to the process, taking into account varying cost considerations and distinct value drivers. It is noteworthy that digital transformation is a continuous process that entails a journey rather than a final destination. Therefore, establishing distinct KPIs for various stages of this process can aid in maintaining focus and direction, as well as showcasing the significance of this process to organizational leadership throughout the journey. (Schräge, M., Muttreja, V., & Kwan, A. 2022)

KPIs are essential in evaluating the effectiveness of a newly integrated digital process. Digital transformation KPIs are utilized to evaluate the efficacy of digital technology, encompassing metrics for customer experience and satisfaction, operational efficiency, marketing strategies, and other customer-centric processes.

Numerous prominent corporations and organizations allocate substantial financial resources towards digital resources, specialized knowledge, and transformation endeavors with the aim of optimizing their ROI or Return On Investment. The identification of KPIs is essential in identifying areas that necessitate improvement and determining optimal strategies for achieving success.

In the event that an organization is shifting from traditional business process systems to a novel ERP system or implementing a cloud-centric document management strategy, the corresponding KPIs will undergo a transformation.

What is the impact of your digital transformation initiatives on your workforce? Is there a correlation between the implementation of new digital products and processes and the improvement or decline of productivity and morale? One should not make the assumption that the employees are enthusiastic about the digital progressions made by their organization. Cultural changes can pose a greater challenge to navigate than technological changes in the context of digital transformation. In addition to assessing revenue, technology, and customer-centric return on investment, it is imperative to ensure that the human resources department is attuned to the following issues when implementing KPIs:

- Employee engagement is a comprehensive measure that indicates the level of commitment, contentment, and involvement of employees in their work.
- The emotional aspect of digital transformation can be comprehended by analyzing employee satisfaction surveys and net promoter scores, which gauge the likelihood of recommending the company as a workplace to a friend or colleague. This approach enables an assessment of the impact on workplace culture.
- The negative impact of employee absenteeism and turnover rates on the ROI of digital initiatives is well documented. In conjunction with low levels of engagement, high rates of absenteeism and turnover can significantly undermine the success of such initiatives. Apart

from the quantitative data, comprehending the reasons behind employee retention, absenteeism, and attrition can potentially enhance holistic employee engagement.

- Workforce productivity is a metric used to quantify the volume of work accomplished by employees within a specified timeframe. The measurement of productivity is contingent upon the nature of the work executed by employees and may encompass various factors, such as the quantity of projects accomplished, sales closure rate, quantity of parts produced, overtime hours, and effectiveness ratio.
- The quantity of newly employed personnel: does the organization currently recruit for additional positions and establish new job designations in response to its digitalization efforts? Through an analysis of the proportion of internal promotions in comparison to external hires, the percentage of technology talent, the prevalence of specialist roles, and the number of employees possessing advanced degrees, the organization can gain a deeper comprehension of the composition of its workforce in relation to the extent of projected digital initiatives.

## 5 CONCLUSION AND DISCUSSION

The focus of this study was aimed at showing, identifying, and developing a proper solution for the targeted questions and inquiries, such as the importance of metrics and KPIs for an industrial company and for decision-makers, and how to improve workflow efficiency as well. Originally, the intention was to reveal the most commonly used essential metrics and help companies to find the best solutions for their existing problems. As it was established, the type of metrics or KPI and its features chosen for a specific company or department differ from one company to another based on the things that need to be measured and the needs of each department manager. It will affect the current organization and economic behavior of the corporate.

Despite the theoretical approach taken in the research, the potential for viable findings and accurate key performance indicator tables and benchmarks could have been realized if there had been greater openness in communication with the targeted company. Enhanced levels of openness were deemed necessary in order to achieve improved outcomes. The company visits were conducted on two occasions, with the presence of language barriers and geographical distance posing significant challenges. Additionally, remote work arrangements also contributed to the difficulties encountered during the visits. The primary concern was the insufficiency of available data. Insufficient communication emerged as a pivotal concern. The organization maintained confidentiality with respect to the project and its implementation details. The rationale behind the adoption of theoretical and empirical approaches in research instead of structural research was due to this factor. The research focus transitioned from functional research to empirical and theoretical research due to insufficient data and inadequate communication with company management following the problem description. Consequently, the creation of KPI tables and dashboards was unfeasible. The customer provided a problem statement, upon which it was proceeded to expound on the theoretical framework, with the expectation that the intended organization would adopt the recommendations in accordance with the theoretical approach.

The study pointed out a general theoretical overview of KPIs, their advantages, disadvantages, areas of usage, and the current available KPIs at the targeted corporation. The study discussed the business transformation and the management structure of an organizations to briefly describe the top-down and bottom-up management approaches. Due to the importance of digital transformation and its impact on the business, company profitability, and overall efficiency tracking, the study briefly explains theoretically the digital transformation, SOA system, and ERP system. The study resulted in several hypotheses to conclude and generate innovative ideas and groundbreaking resolutions for the research questions posed.

Upon collection of data through both physical company visits and virtual online meetings, the proposed solution provided by the targeted company to address their current issue was assessed and deliberated. It was observed that a significant proportion of the workforce in the company lacks adequate technological proficiency. Consequently, the proposition of introducing novel KPIs to enhance operational efficiency for the manufacturing teams through training and education appears to be an unproductive allocation of resources. It was observed that managers may not possess complete awareness of the requirements of their subordinates. The implementation of a new KPI tool at the manufacturing plant's work floor, as proposed by the manager, is likely to result in increased complexity and time waste. The level of clarity regarding the potential implementation of a management structure shift by the company, or whether the new project entails a minor management shift, remains uncertain.

The present strategic outlook and conceptual framework of the organization concerning this particular initiative endorse the retention of the previous management module, thereby perpetuating the unresolved issue. Engaging in incremental actions and making concise decisions can help maintain the current state of affairs. The implementation of novel KPI dashboards may be a viable option, albeit not necessarily the optimal one.

Enhancing comprehension of KRAs and gaining a holistic perspective of the organization's present condition, impending modifications, and their ramifications can heighten the likelihood of resolving issues in a lasting manner. The researcher's proposed solution involves the adoption of a bottom-up leadership structure and the implementation of KRA as an essential evaluating metric. To initiate operations in a proficient manner, it is recommended to leverage the advantages of the ongoing digital transformation during the current season, allocate additional resources towards the information technology department, and optimize the utilization of the recently implemented enterprise resource planning (ERP) system.

More research needs to be done on organization systems, team structures, and means to create hybrid solutions between KPIs and KRAs.

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## APPENDIX 1. LIST OF VARIOUS PERFORMANCE INDICATORS

73 Essential Manufacturing Metrics and KPIs to Guide Your Industrial Transformation. (Jenkins, 2022)

### Top Manufacturing Key Performance Indicators

1. Production Volume = Total # of products manufactured during a specified time frame
2. Production Downtime = Sum of all downtime during a specified time frame
3. Production Costs = Direct labor cost + direct material cost + overhead costs
4. Overall Equipment Effectiveness (OEE) = Performance x quality x availability
5. Overall Operations Effectiveness (OOE) = Performance x quality x availability
6. Total effective equipment performance (TEEP) = Performance x quality x availability
7. Capacity Utilization = (Total capacity used during a specific time frame / total available production capacity) X 100
8. Defect density = # of defective units / total units produced
9. Rate of return (ROR) = (Current value – initial value / initial value) X 100
10. On-time delivery (OTD) = On-time units delivered / total delivered units
11. First time right (FTR) = Total # of good units / total number of units in process
12. Inventory turns = Cost of goods sold (COGS) / average inventory during a specified time frame
13. Asset turnover = Net sales / average total asset value
14. Unit Costs = Variable costs + fixed costs / total units produced
15. Return on assets (ROA) = Net income / average value of total assets
16. Maintenance cost per unit = Total maintenance costs in a specific time frame / # of products produced during the same time frame
17. Revenue per employee = Total revenue in a given period / (# of full-time employee equivalents at beginning of period + # of full-time employee equivalents at end of period/2)
18. Profit per employee = Net income for a given period / (# of full-time employee equivalents at beginning of period + # of full-time employee equivalents at end of period/2)

### Efficiency Manufacturing Metrics

19. Throughput rate = Total number of good units produced / specified time frame
20. Work in process (WIP) = (Beginning WIP + manufacturing costs) – cost of goods manufactured
21. Schedule attainment = (Actual production output in units / target production output in units) x 100
22. Scrap material value = Amount earned on disposing scrap material – disposal cost
23. On standard operating efficiency rate = # of products produced at or below estimated costs in a given period / total # of products produced in the same time frame
24. Asset utilization = Revenue in a given period / (value of assets at beginning of period + value of assets at the end of period/2) X 100

### Cost & Profitability Manufacturing Metrics

25. Total manufacturing cost per unit excluding materials = (Total manufacturing costs – cost of materials) / total number of units manufactured
26. Manufacturing cost as a percentage of revenue = Total manufacturing costs / overall revenue
27. Net operating profit = (Revenue – operating expenses) – interest and taxes
28. Productivity in revenue per employee = Total revenue / total employees
29. Average unit contribution margin = (Total revenues – total variable costs) / total volume of production
30. Return on net assets (RONA) = Net income / (value of fixed assets + net working capital)
31. Energy cost per unit = Sum of all energy costs / number of units manufactured
32. Cash-to-cash cycle time = (Days inventory outstanding) + (days sales outstanding) – (days payables outstanding)
33. Earnings Before Interest, Taxes, Depreciation, and Amortization (EBITDA) = Net income + interest + taxes + depreciation + amortization
34. Reorder point = (# units used daily x # days lead time) + # units safety stock
35. Employee turnover = (Turnover Rate = # of separations in a given period / (# of employees at start of period + # of employees at end of period/2)) × 100

### **Manufacturing Compliance Metrics**

36. Reported health and safety incidents = # of health and safety incidents reported to OSHA during a specified time frame
37. Health and safety incidence rate = (# of OSHA-recorded injuries and illnesses X 200,000\*) / total employee hours worked
38. Reportable environmental incidents = # of environmental incidents reported to the EPA during specified time frame
39. Number of non-compliance events per year = # of non-compliance events during a 12-month period
40. Failed audit rate = # of failed audits in a given period / total # of audits conducted in the same period

### **Maintenance Manufacturing Metrics**

41. Maintenance unit cost = Total maintenance costs in a specified time frame / # of products produced during the same time frame
42. Mean Time Between Failure (MTBF) = Operating time in hours / # of failures
43. Mean Time to Failure (MTTF) = Operating time in hours / # of failures
44. Percentage planned maintenance = (# of planned maintenance hours / # of total maintenance hours) × 100
45. Percentage planned vs. emergency maintenance work orders = (# of planned maintenance hours / # of unplanned maintenance hours) × 100
46. Unscheduled downtime = Sum of all unscheduled downtime during specified time frame

47. Downtime in proportion to operating time = Total time equipment is down: Total time equipment is in operation
48. Avoided costs = (Assumed repair cost + production losses) – preventive maintenance cost
49. Machine set-up time = Time required to prepare machine for next run

### **Customer Experience & Responsiveness Manufacturing Metrics**

50. On-time delivery rate = # of products delivered on time / total number of products delivered
51. Lead time = Order process time + production lead time + delivery lead time
52. Customer fill rate = (# of orders delivered / # of orders placed) X 100
53. Customer return rate = (# of return customers / total # of customers) X 100
54. Percentage of satisfied customers = (# of customers who said they were either very or extremely satisfied / total # of surveys filled out) X 100

### **Quality Manufacturing Metrics**

55. Yield = (Actual # of products manufactured / theoretical number of maximum possible yield based off raw materials input) X 100
56. First time yield = # of non-defective or good units / total # of products manufactured
57. Perfect order percentage = (Percent of orders delivered on time) X (percent of orders complete) X (percent of damage-free orders) X (percent of orders with accurate documentation) X 100
58. Return merchandise authorizations = (# of RMAs / # of orders delivered) X 100
59. Customer reject rate = (# of rejected parts / total #of parts in all products shipped) x 100
60. Supplier's quality incoming = # of quality raw materials received / total # of incoming materials
61. Scrap rate = Amount of scrap material produced during a manufacturing job / total materials intake or put into the process

### **Lean Manufacturing Metrics**

62. Cycle time = (Time customer received order – time customer placed order) / # total shipped orders
63. First pass yield = # of non-defective products excluding rework and scrap / total # of products manufactured
64. Capacity utilization = (Total capacity used during specific timeframe / total available production capacity) X 100.
65. Machine downtime rate = Total uptime / total uptime + total downtime
66. Downtime in proportion to operating time = Total available time to run – scheduled and unscheduled stoppages
67. Material yield variance = (Actual unit usage – standard unit usage) x standard cost per unit
68. Overtime rate = (Overtime hours / total hours worked, including overtime) X 100

### **Performance Metrics**

69. Production attainment = (Actual production / scheduled production) x 100
70. Average changeover time = Total time to changeover production lines / # of changeovers
71. Takt time = Total available production time / average customer demand

### **Manufacturing Innovation Metrics**

72. New product introduction rate = # of new products / new product introduction goals
73. Engineering change order cycle time = Engineering change order cycle time in days, weeks, or months