

Work force management

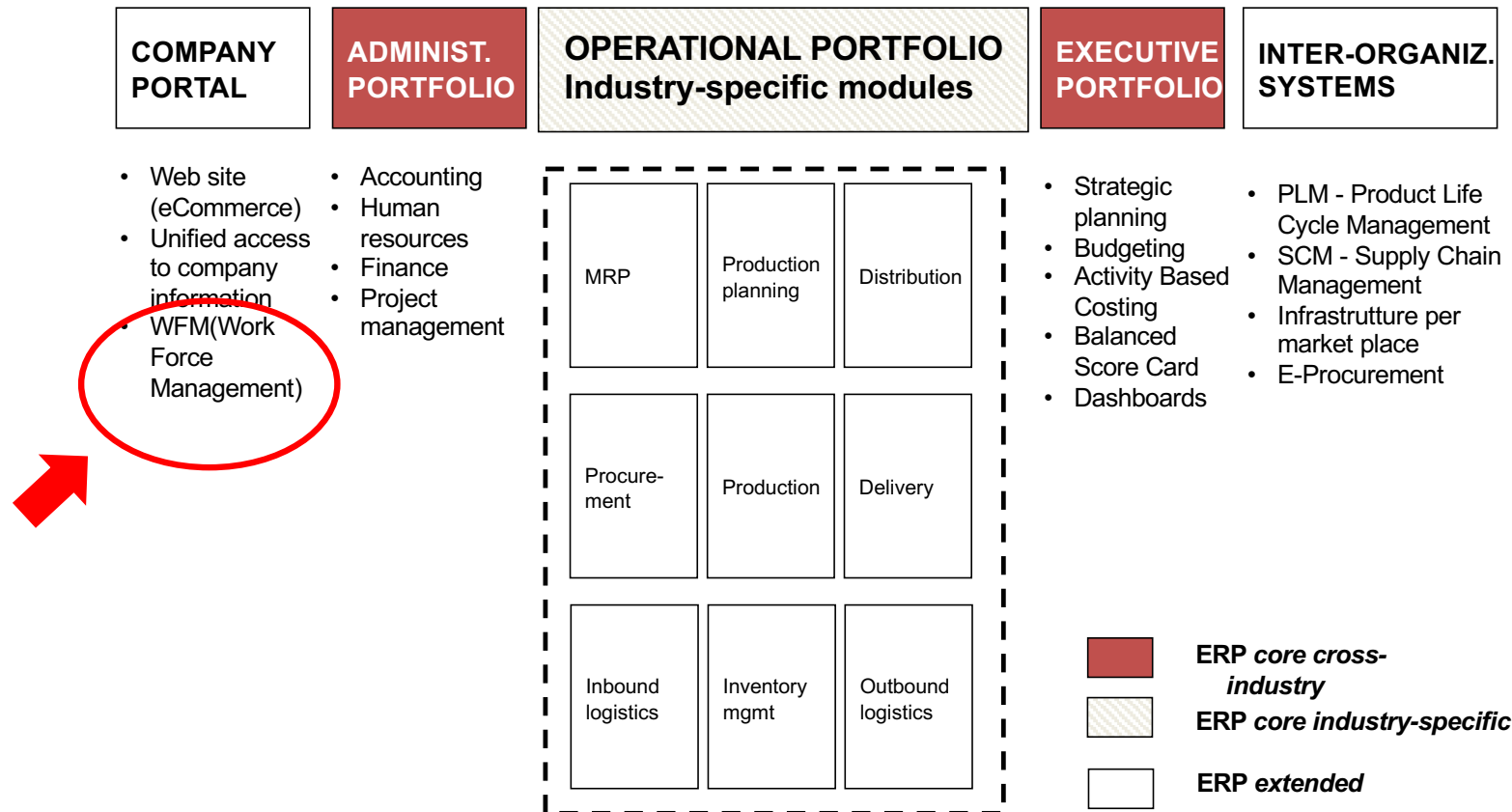
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Agenda

- Functionalities and technology architecture of WFM
- Case study: OTIS elevators
- Case study: Utility company



Functional architecture of ERP systems: overview



What is WFM?

- Target: post-sale services
- Work force: employees with technical skills who are in charge of maintenance processes
- Maintenance:
 - Routine maintenance: it is scheduled by the company and represents a profitable service.
 - Emergency maintenance: it is asynchronous and must be scheduled, executed, and billed according to the characteristics of each individual maintenance request.
- Both types of maintenance typically involve a physical maintenance activity on the product/plant at the customer's site

Is maintenance profitable?

- Routine maintenance is profitable (particularly, the sale of spare parts)
- Emergency maintenance is often non profitable.
- Without an ERP, the typical situation is that overall maintenance (routine + emergency) is a cost center instead of a profit center.

Why is maintenance costly?

- Customers (and the workforce) are physically distributed over a (possibly) large geographical region.
- Visits are costly.
- Maintenance activities can involve different skills. The optimization of teams, schedule, and visits is not an easy task.
- A maintenance request is often generic and multiple visits are needed to specify customers' needs.
- Spare parts may or may not be available, especially for emergency maintenance.
- SLA can be tight. If human life is involved, companies must oversize their workforce (e.g. elevators).

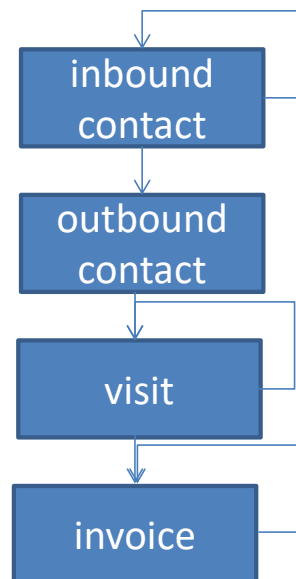
Maintenance is a service

- Maintenance should be seen as a service that has an impact on customer loyalty.
- Maintenance becomes profitable if we account for the positive impact on customer loyalty (reduction of customer turnover).
- Customer loyalty is not easy to achieve.
- Customer loyalty is tied to emergency maintenance more than it is to routine maintenance.
- Customers may decide not to buy an ordinary maintenance service, but need an emergency maintenance service anyway.

Outsourcing maintenance?

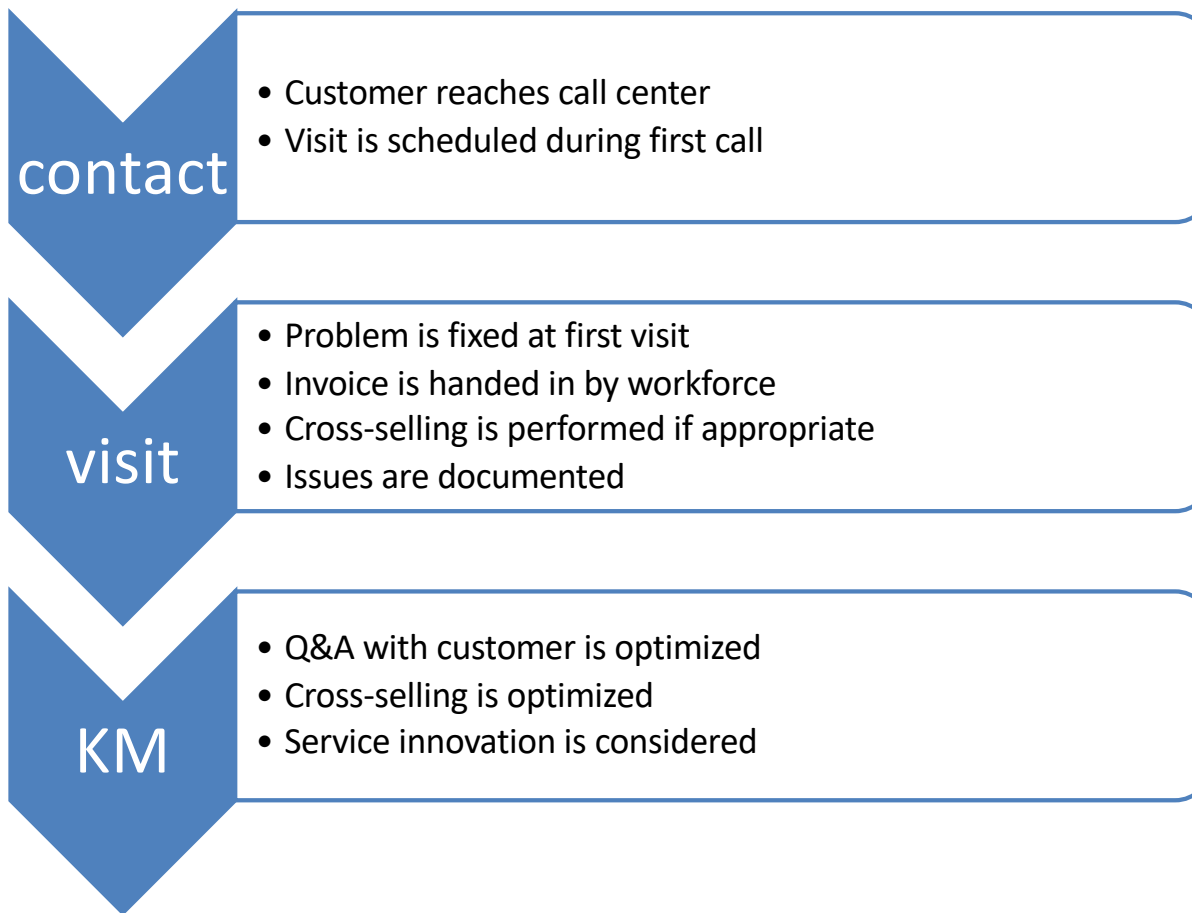
- Why non proprietary maintenance services?
 - The sale of spare parts can be used as an economic lever. If price is high, non-original spare parts are available on the market.
 - The physical distribution of customers gives an edge to local maintenance services.
 - In general, smaller companies are more flexible and can accommodate maintenance with greater efficiency.
- In some cases, companies partner with non proprietary maintenance services to outsource maintenance.
- Outsourcing maintenance can be risky:
 - Non-effective maintenance has a negative impact on the company's brand equity.
 - Legal issues/liability for inefficient emergency management.
 - No cross-selling.

The worst maintenance process (no ERP)



- Reworks: inbound and outbound contacts
- No intelligent Q&A in first call
- Multiple visits (no spare part in truck, team skills are not adequate to customer problem)
- Internal coordination with workforce team members
- Errors in invoice
- No cross selling
- No KM

The ideal maintenance process



Key actions towards the ideal process

- Implement a KM process:
 - Ask questions during first contact to describe the nature of the maintenance issue
 - Involve workforce in KM process
 - Create editors of new knowledge on maintenance processes provided by workforce
 - Cluster maintenance issues and relate to skills of workforce
- Implement embedded technologies to help prevent emergency maintenance through targeted routine maintenance
- Redesign maintenance process by considering truck as a warehouse of spare parts replenished with JIT logic
- Generate invoices automatically

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OTIS elevators: the starting point

- OTIS is a global leading company in its sector
- It has not outsourced maintenance, as it has been always perceived as key to the brand
- Maintenance is:
 - Challenging, since safety is involved
 - Interesting since the life of the product is particularly long and demand is a steady variable
- The strategy of OTIS is to sell the maintenance contract together with the product to get as many subscriptions as possible before competitors come in

OTIS elevators: the management issue

- They experienced a decrease in market share (maintenance market)
- The decrease was faster in urban areas where smaller competitors provided maintenance services at a lower price.
- Urban areas are the most profitable areas for maintenance services and decreasing price would significantly reduce profitability.
- OTIS applied higher prices also due to high internal costs, therefore lowering prices to a competitive level would make OTIS maintenance processes non profitable.

OTIS elevators: the solution



- They implemented KM
- They redesigned their maintenance processes
- Their goal was cost reduction, but they continued to sell their service as leading service as opposed to low cost solutions
- They implemented embedded technologies and reduced the need of emergency maintenance by over 30%.
- Their leveraged their position as large global company to provide a highly responsive call center service (OTISLINE communication service).
- With mobile devices, the workforce has real time access to technical and administrative information

OTIS elevators: the solution



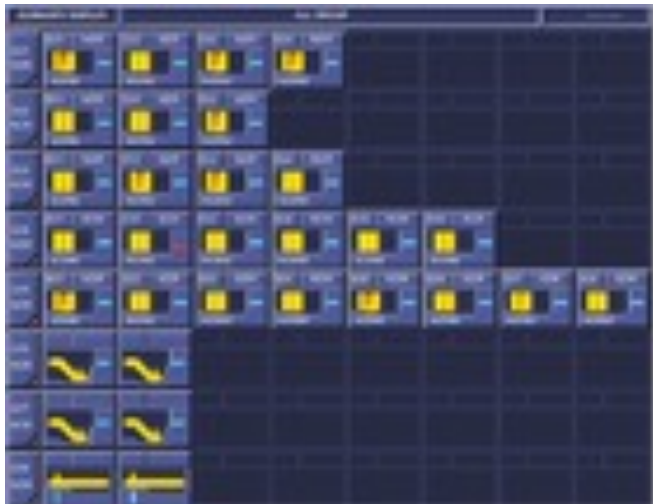
“Otis offers a variety of maintenance programs and building support systems to fit customers’ needs and equipment types. We have standardized work practices around the world and can tailor a maintenance program specifically to the environment. Ultimately, **the right maintenance at the right time extends the life of the equipment and protects the owner’s investment.**”

OTIS elevators: the solution



Otis developed the REM (Remote Elevator Monitoring) system to optimize elevator performance and minimize elevator downtime. It is a **sophisticated interconnected system of sensors, monitors, circuits, hardware and software to collect, record, analyze and communicate data about elevator operations 24/7**. If the REM system detects a problem, it analyzes and diagnoses the cause and location, then makes the service call and helps an Otis mechanic identify the component causing the problem. Elevators are often back in service before owners or tenants even know there is a problem.

OTIS elevators: the solution



The Web-based EMS Panorama system enables building staff to monitor, control, report on and manage a full range of operation-critical functions from any computer with an Internet connection. Users can monitor the status of up to 30 groups of elevators, escalators and moving walkways, looking at a single building or an entire airport, college campus or medical center. Because the EMS Panorama system offers comprehensive, real-time data that shows building managers the full picture, they are able to respond quickly to passengers' needs and make informed decisions about equipment operations with greater certainty than ever before.

OTIS elevators: final considerations

- It does not look as a low-cost maintenance service....
-it looks as a high-quality service that aims at customer loyalty.
- They have reduced internal costs by improving coordination.

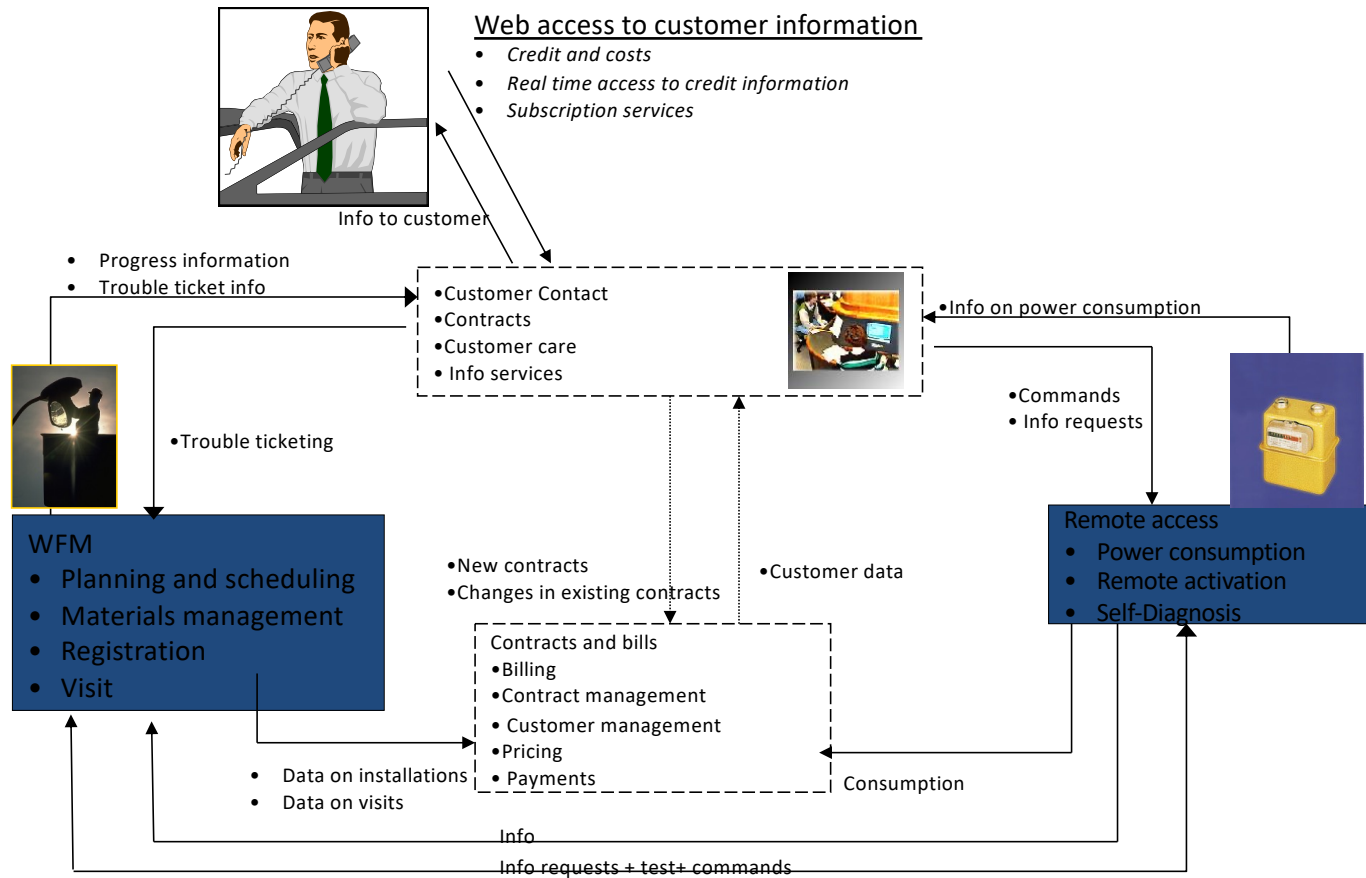
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WFM in a utility company (power supply)

- In utility companies, WFM is tightly related to back-office legacy functionalities:
 - Billing: it includes all accounting functionalities. Billing is usually periodical and includes the cost of maintenance (both routine and emergency)
 - Scheduling of workforce activities is usually one for both installations and maintenance.
- Maintenance is often requested by multiple customers (e.g. blackout)
- Maintenance and general inquiries go to the same call center

Maintenance processes



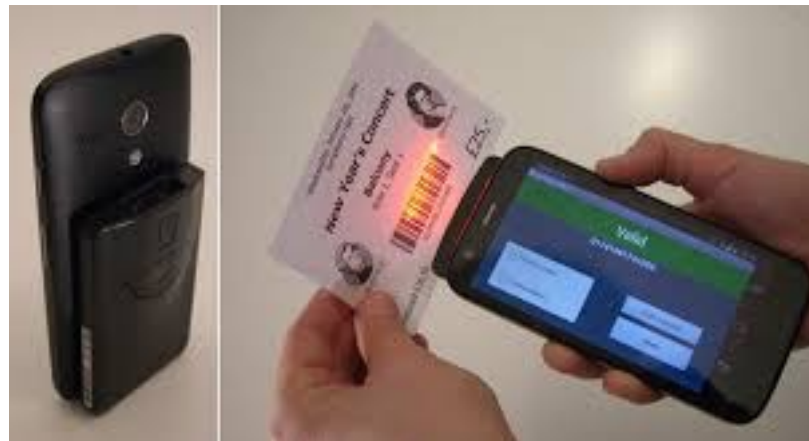
Team empowerment

The team is in charge of a number of activities that in other sectors are executed by the call center operators, such as:

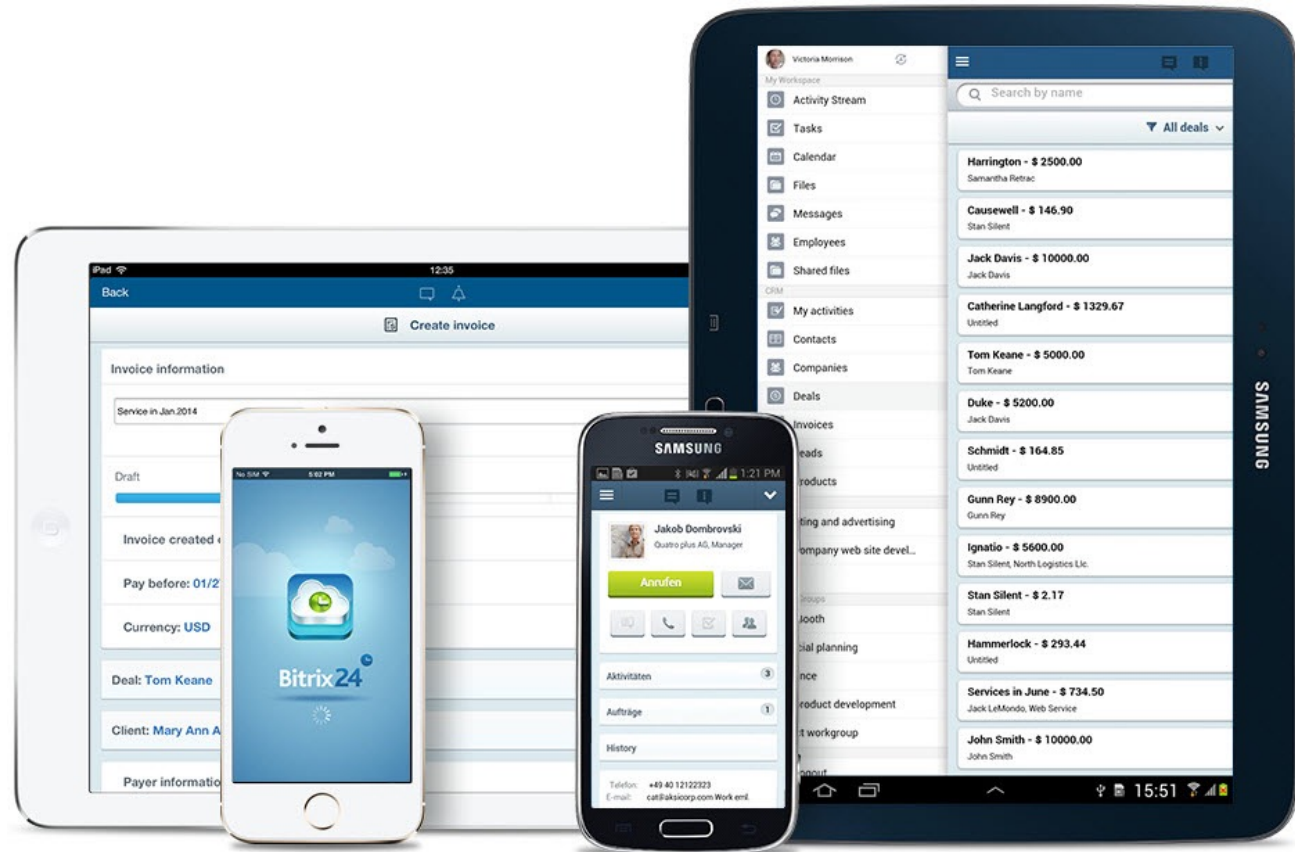
- Emergency management: teams are alerted on requests and make a decision on the schedule
- Remote control of plants: team members can access remote control functionalities of plants
- Spare parts: the team is in charge of replenishing their van
- Contract management: the team has sales capabilities and can issue contracts on site to avoid paper exchanges with customers

Enabling technologies

- Smartphones:
 - Real time access to company information
 - Contact management (direct from customers)
- Bar code readers that can be integrated with smartphones or NFC technologies (RFiD) used to manage spare parts
- Portable printers used for customer care and administrative functionalities (contracts, invoices)



Sample ERP functionalities on smartphones



Smart metering



- Remote access to energy consumption information (in real time)
- Alerts and alarms
- Self diagnosis
- Remote controls (on-off, limit to energy consumption, ...)