BUSI4496

Supply Chain Planning & Management

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Division of Operations Management and Information Systems

Lecture 3 – Self-Study Session 2

6. Enterprise Resource Planning (ERP) systems- Self study

7. Review questions

Nottingham University Business School

UNITED KINGDOM • CHINA • MALAYSIA

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Outline

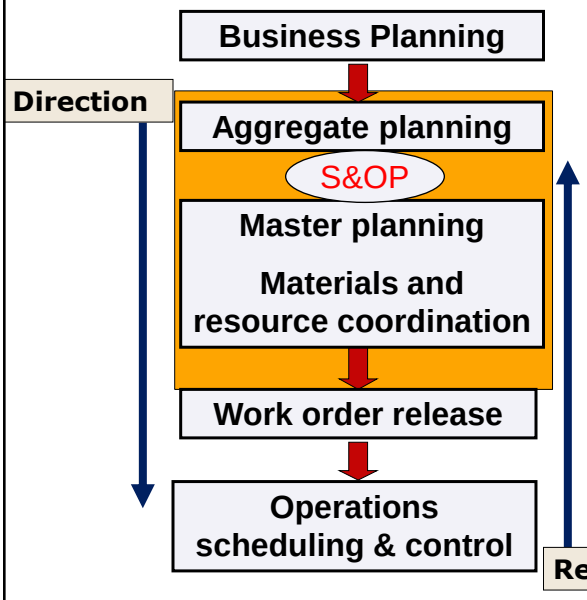
1. Aggregate Planning
2. Sales & Operations Planning (S&OP)
3. MRP principles and overview
   - Independent and Dependent demand
   - Overview, main components and computations
4. MRPII and Capacity Requirements Planning
   - Requirements for effective MRP-based control

……

Pre-Recorded Self Study Session on Moodle

5. Running an MRP- based planning and control
6. Enterprise Resource Planning (ERP) systems and IS/IT support for Supply Chain Planning
7. Review questions

Hierarchical Planning (HPP)



- Check at each level ensure plans realistic, feasible - appropriate constraints set for next level down
- Brings stability
- Different aspects dealt with over different time frames
- Each planning level has a degree of autonomy within the constraints set

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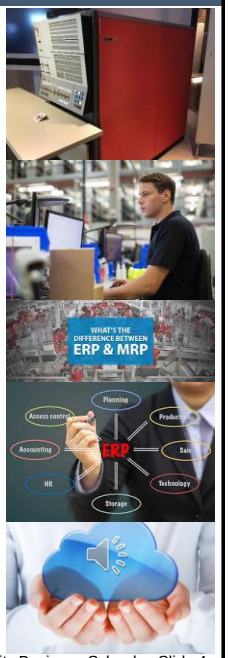
MRP evolution

- **MRP** – Materials Requirements Planning – basic, just material plans
- **MRPII** – Manufacturing Resources Planning – uses the information in the system to plan better and control costs
- **ERP** – Many implementations contain MRPII modules
- **Cloud-Based ERP services** (SaaS)
- But many **legacy (old systems) MRP systems still in use**

https://www.erpfocus.com/



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6. Enterprise Resource Planning Systems - ERP

TREK https://tinyurl.com/jds2t7l

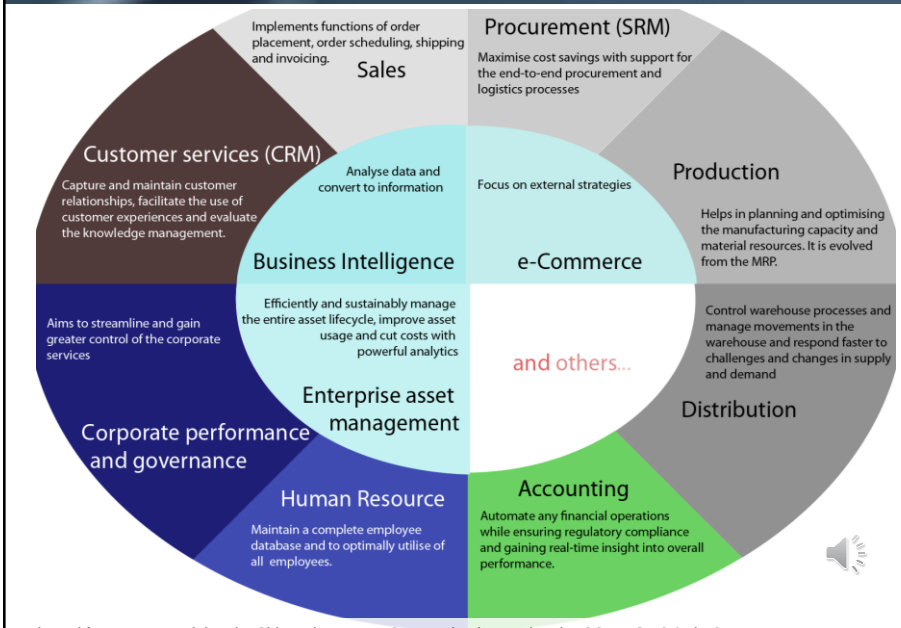
HAGLER SYSTEMS https://tinyurl.com/jg2a6nb

SAP HANA https://tinyurl.com/hs3vqqk

What is ERP?

- **'Rough' description**
  - a business software 'package' providing everything needed to plan, operate and control business operations
  - supports all business functions
- **Sales, marketing and business planning**
  - forecasting, aggregate planning, sales and operations planning, supply chain design
- **Procurement/purchasing/ supply chain management**
- **Production and materials planning**
  - Plans, schedules, resources, tracks, quality
- **Order management and logistics**
  - receipt, production, storing, distributing, billing etc
- **Other major areas**
  - human resources, finance and accounting, performance measurement, corporate reporting and information

ERP scope – continually increasing



Adapted from "ERP Modules" by Shing Hin Yeung - Own work. Licensed under CC BY-SA 3.0 via Commons - https://commons.wikimedia.org/wiki/File:ERP_Modules.png#/media/File:ERP_Modules.png

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ERP in Managing Business Processes

- **Enterprise Resource Planning (ERP) as a management process:**

"…framework for organizing, defining, and standardizing the business processes necessary to effectively plan and control an organization so the organization can use its internal knowledge to seek external advantage." APICS

- **SAP**
- **ORACLE**
- **MICROSOFT DYNAMICS**

ORACLE® ERP

Microsoft Dynamics™

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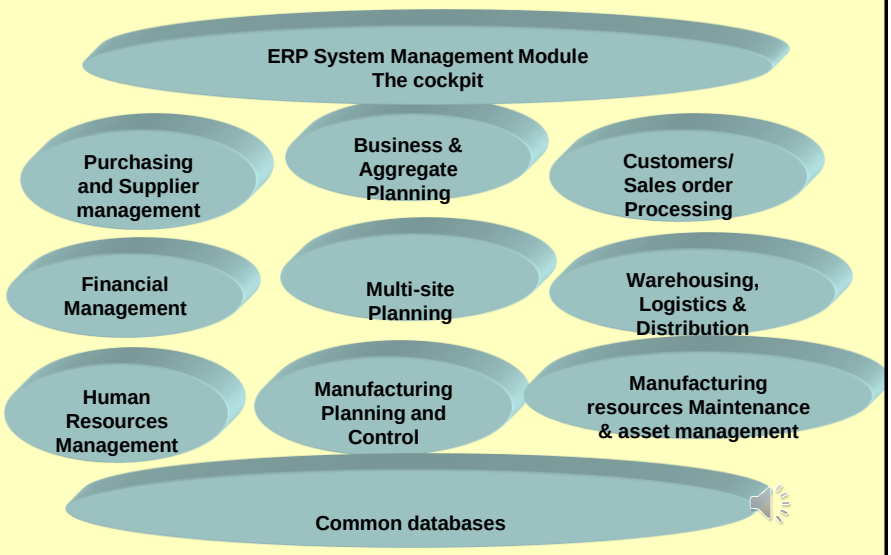
ERP – a functional/modular view



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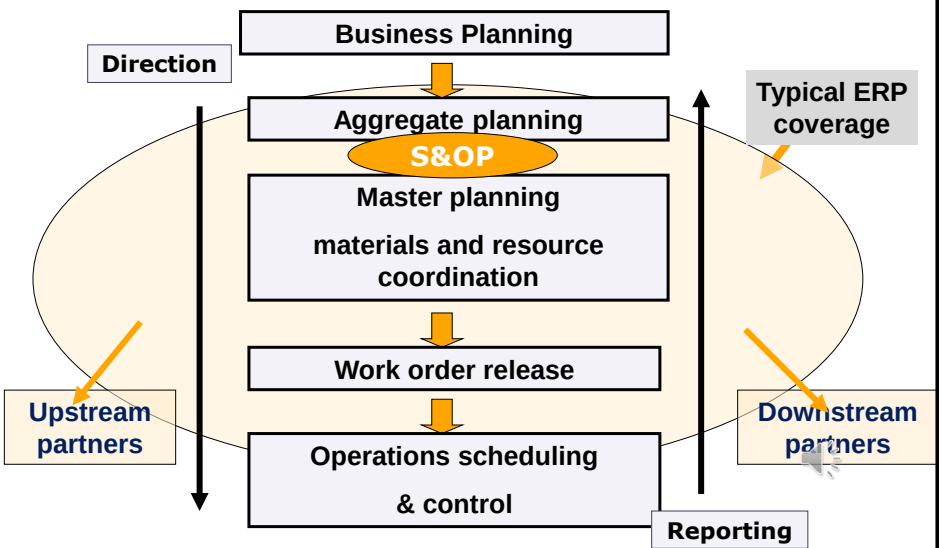
ERP- typical scope for planning

- in a hierarchical planning and control system



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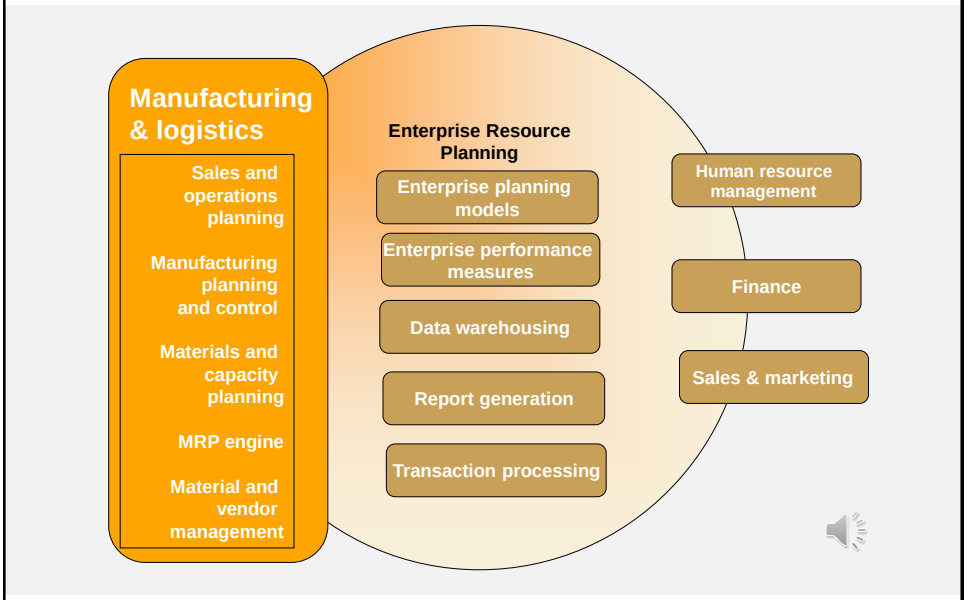
ERP - An applications perspective



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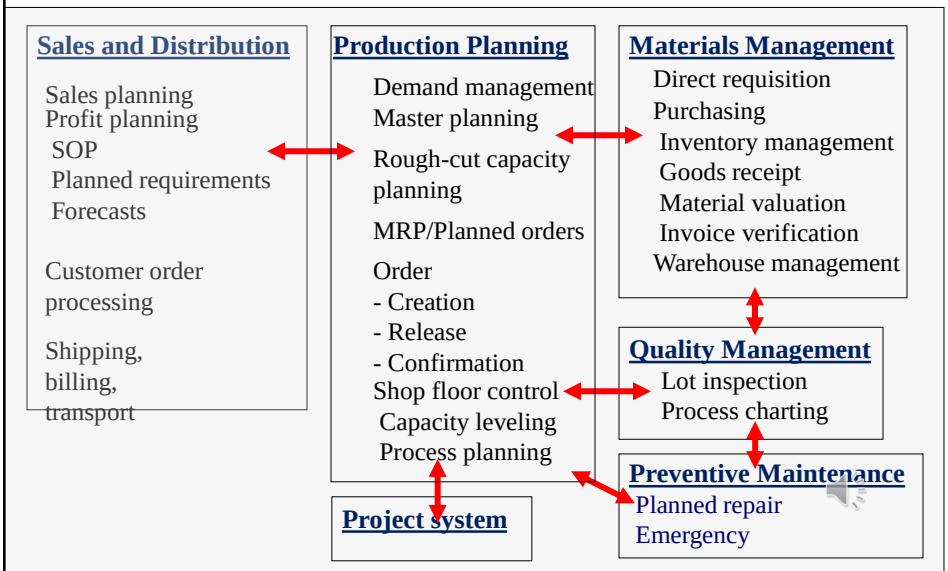
ERP – 'Seamless' integration between modules



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ERP requires standard processes

- Every process is documented!

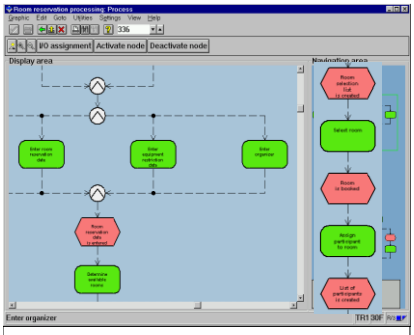


Figure 16: Flow Process Diagram for Reserving a Conference Room

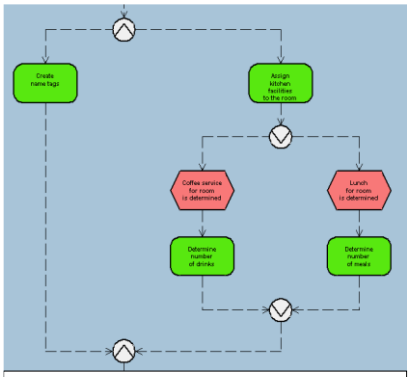


Figure 18: Room Reservation Process Continued

Cloud-based ERP solutions

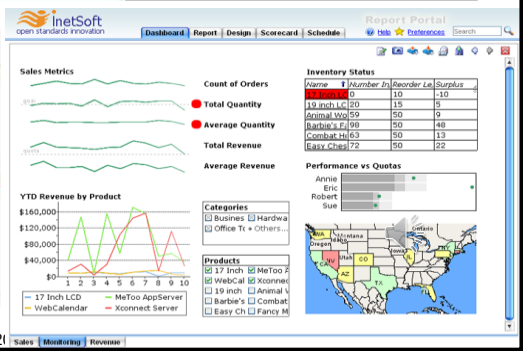
Cloud solutions help business 'scale' quickly and cheaply

https://www.youtube.com/watch?v=SZ2VpZy0i7E

https://www.youtube.com/watch?v=koexOW0mQP4

Real-time performance measurement using ERP data

- Performance 'dashboards' to monitor performance close to real time
- Different dashboards for different functional areas



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Many new digital tools coming to the market!

Selection methodology

- Gartner Magic Quadrant (Leaders / Visionaries / Challengers
- Gartner Peer Insights Ratings

Gartner Magic Quadrants across Analytics & BI, WMS, TMS, RPA and Supply Chain Planning
Leaders - Solid understanding of product capabilities, attractive pricing model
Visionaries – Strong, differentiated vision
Challengers - Limited to specific use cases, technical environments or application domains

From: Nisarga Save, 2022

Transportation management

BlueYonder SAP ORACLE Manthattan Trimble ENERGYGATE TRANSPLACE EZOPEN TMC

Supply chain planning

OMP KINAXIS BlueYonder Anaplan JDA GAINS EZOPEN ARKIEVA Adexa ORACLE RELEX SAP LOGILITY SupplyVue

Reporting & Analytics

tableau Qlik ORACLE SAP ThoughtSpot IBM SAS YellowFin tellius Looker DOMO

WMS (WES / WCS / LMS / YMS)

ORACLE SAP infor Manthattan REPLY Softeon EPG csvs SCHAFER

RPA

UiPath AUTOMATION ANYWHERE blu prism NICE PEGA MuleSoft SAP

Strategy (Network design / optimisation)

coupa BlueYonder Anaplan OMP AIMMS

Control Tower

infor SAP centiro SUPPLYO BLUECRUX Palantir project44 EZOPEN

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Read more if you are interested

- Zhang, G., MacCarthy, B. L., & Ivanov, D. (2022). The cloud, platforms, and digital twins—Enablers of the digital supply chain. In The digital supply chain (pp. 77-91). Elsevier.
- https://www.researchgate.net/profile/Bart-Maccarthy/publication/361679630_The_cloud_platforms_and_digital_twins-Enablers_of_the_digital_supply_chain/links/66367f9906ea3d0b7427ee72/The-cloud-platforms-and-digital-twins-Enablers-of-the-digital-supply-chain.pdf

Key learning points 3

- **ERP systems are IT systems that cover all operational and transactional aspects of a business (including financials)**
  - MRPII type thinking is embedded in planning and control modules of many of the leading ERP vendors
  - Enterprise Resource Planning (ERP) systems may bring many benefits but they need to have the right processes, methods, and techniques
  - ERP systems are moving to the **CLOUD**
  - Remember IT alone does not guarantee success in planning and control!
  - Useful summary video https://tinyurl.com/zsycj54

7. Review questions for Session 3

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Review questions for Session 3

These questions and answers should help you to think about, revise and consolidate the material covered in the lecture.

1. **Explain the Hierarchical Production Planning (HPP) process.**
2. **What does Aggregate Planning seek to achieve? What decisions are typically made in aggregate planning?**
3. **What is Sales & Operations Planning (S&OP) and how does it differ from Aggregate Planning?**
4. **Describe briefly the main inputs to an MRP system and the main outputs that are generated by a basic MRP system.**
5. **Explain generally how an MRP system does its calculations.**
6. **What is the Master Production Schedule (MPS) in an MRP system?**

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Review questions for Session 3

7. **What is the Master Production Schedule (MPS) in an MRP system?**
8. **MRPII requires capacity checking – why is this necessary and at what levels are capacities checked?**
9. **What is a capacity requirements plan (CRP) and when is it generated?**
10. **Why are accurate data and appropriate parameter settings necessary for effective MRP/MRPII systems?**
11. **What is an ERP system and what parts of the planning hierarchy does ERP support?**
12. **ERP systems require business processes to be standardised – why is this and can it cause any problems?**

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4. **Describe briefly the main inputs to an MRP system and the main outputs that are generated by a basic MRP system.**

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Q7. Sample answer

Basic MRP systems require three main inputs:

1) The Master Production Schedule (MPS) is a primary input to an MRP system. It is a statement of what the organisation intends to produce at independent demand level over future time periods, e.g. how many final products of each type will need to be ready every week over a 6-month period. The MRP system needs this information to begin its calculations. (Q7 which asks for more details on MPS).
2) Bills of Materials (BOMs) contains all the information on how each product is made. The MRP system needs this information to perform its calculations. BOMs require an extensive database, typically called a parts master file in traditional MRP.
3) Inventory information, which includes the inventory the firm has in stock (known as on-hand inventory) and the inventory it has currently on order from suppliers and when it will arrive. The MRP system needs this information to perform its calculations. As with BOM's, inventory information requires an extensive database.

Q7. Sample answer contd.

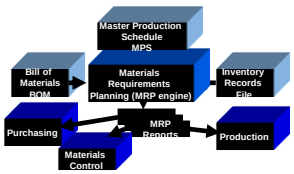
Basic MRP systems generates two main outputs:

1) The purchasing plan – shows what items have to be purchased from suppliers in what quantities and when the purchase order needs to be launched.
2) The production plan – these are the work orders that specify the parts, components and sub-assemblies that have to be produced by the firm in a specific time period.

Basic MRP systems may also generate a materials coordination plan to ensure that bought-in material and in-house production are coordinated.

MRPII systems generate an additional output a capacity plan (see Q8)

A diagram may be useful to help illustrate your answer to this question e.g.



Now try one of the questions for yourself