



The Penetration of RFID Technology across EU Industries

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Agenda



- RFID Adoption Trends and Barriers
- RFID Benefits
- RFID Contribution to Productivity & Innovation
- Potential Impact of RFID
- Conclusions & Outlook
- Policy Implications

Context & Background

RFID (Radio Frequency IDentification):

- Used to identify and collect data attributes of objects or persons through a wireless connection
- Automatic identification and data capture method
- RFID is not a plug-and-play solution, it requires new skills and organizational changes
- RFID enables tasks automation, supply chain control, real-time business visibility and potentially new business models
- A key of the “Internet of Things” scenario

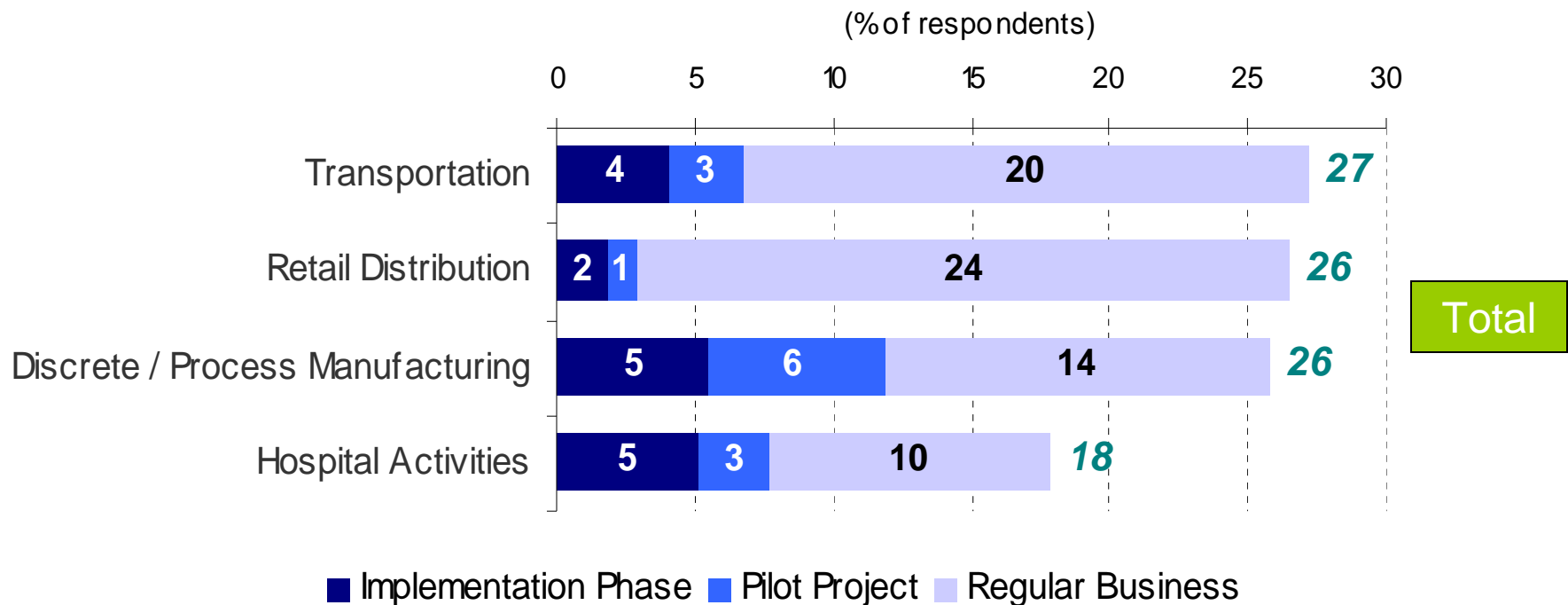


Evidence Base of the Study



- A Survey Sample of 434 interviews in 7 EU MS (D, ES, F, I, IE, PL, UK); data weighted by employment
- Target: Enterprises with over 50 employees in the Manufacturing, Retail Distribution, Transportation, Hospital Activities industries
- 10 Case Studies of innovative and good practice examples of RFID implementation

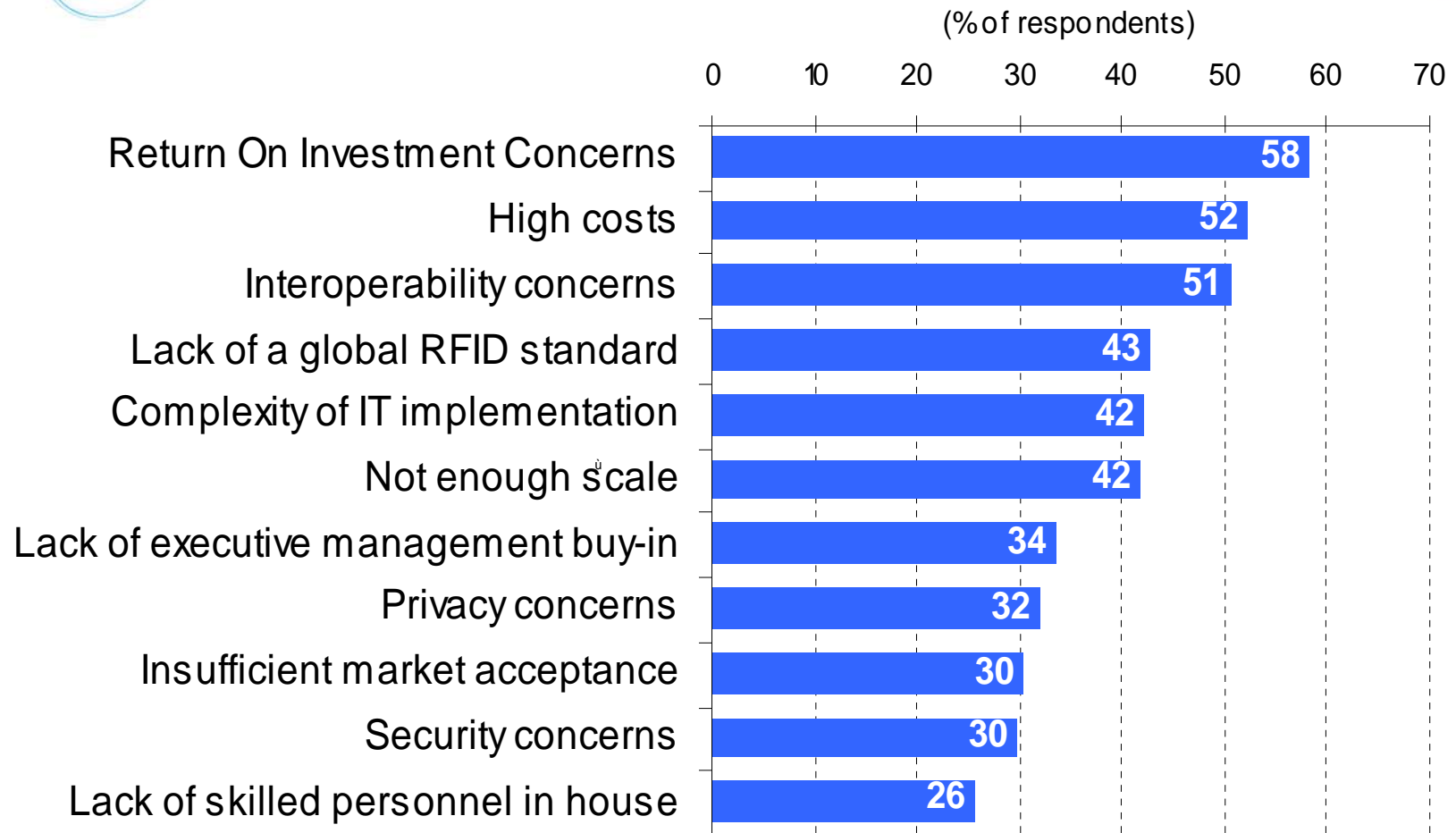
Current RFID Adoption



Source: e-Business Survey 2007
N=434

**Estimated average RFID diffusion in 2007:
24% of enterprises in targeted sectors**

Barriers to RFID Adoption



Source: e-Business Survey 2007

Base: All respondents with firms not using or planning to use RFID
Number of valid respondents: 353



RFID Adoption Trends



Diffusion is growing fast

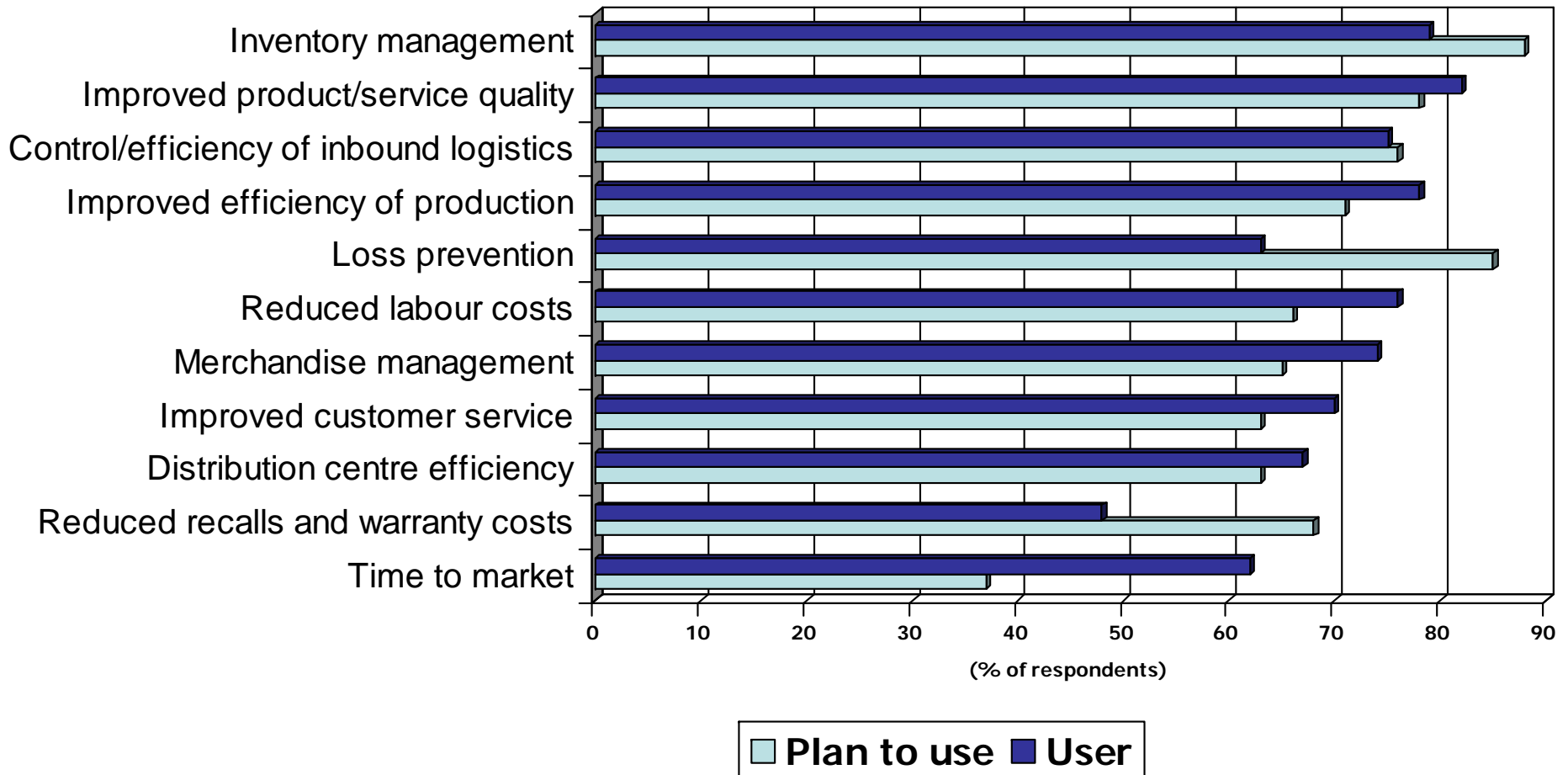
- Estimate of 27% annual growth in the number of enterprises adopting RFID for the period 2007-2009
- Penetration is positively correlated with company size (twice as high for very large enterprises, over 1000 employees)

Main drivers are:

- Improving the efficiency of production processes
- improving product track-and-trace capabilities

RFID Key Benefits

Survey Question: What are the key benefits of RFID for your company?



Source: e-Business Survey 2007, N=156



Retail: Focus on the Supply Chain and Goods availability



- 12% to 17% overall improvements in supply chain process efficiencies (METRO)
- Loss/theft shrinkage between 11% to 18% (METRO)
- Reduced spoilage of perishable goods (Schuitema)
- Electronic dispatch note: savings of up to €2.84 per note (METRO)
- 13% reductions of inaccurate understated perpetual inventory (WalMart)
- 10% to 60% reductions in out-of-stock situations (METRO, Walmart)
- Real-time supply chain visibility (Schuitema, HP)



Healthcare: Improving Safety and Quality of Services



Main Applications:

- Check of Drugs authenticity, Medical equipment tracking, Patient identification, Medical samples tracking (for example blood transfusion safety)

Main Benefits:

- Up to 100% reductions in transfusion errors (Istituto dei Tumori and pilot result in 4 Italian hospitals)
- Up to 90% reductions of FTEs assigned to inventory tracking activities (Motol Hospital, University Medical Center Tucson, Arizona)
- Wayne Memorial Hospital saved over \$300k by reducing infusion pumps orders



Manufacturing: Saving Time and Reducing Errors



- 15 to 20 seconds per pallet saved in order picking & pallet receiving (Gillette)
- Up to 20% improvement in WIP (HP)
- 20%-25% improvement in production cycle times (HP, Honda)
- 28% reductions in inventory levels (HP)
- 90% reductions of inventory tracking Full Time Equivalents (FTE) (Futura Systems)
- 83% reductions in shipping errors (Futura Systems)
- Faster invoice matching procedures when fully integrated with ERP and EDI systems



Transportation & Logistics: Improving Reliability



- 17% productivity increase in airline baggage handling (Hong Kong Airport)
- Improved mobile assets visibility & utilization rates (EuroPool systems)
- 90% improvement in reliability of delivery time windows (Dow Chemical Company, NYK Logistics)



RFID Contribution to Productivity Improvement



- Evidence from case studies of labour and total factor productivity gains, confirmed by survey
- Improved business intelligence capabilities
- Improvements achieved within a relatively short timeframe (eg compared to ERP adoption)



But Productivity Improvements depend on:



- Quality and sophistication of ICT infrastructures (old legacy systems are a constraint)
- Level of business process automation (lesser benefits if automation is already advanced)
- Implementation within a re-organization and business process re-engineering strategy
- Implementation in cooperation with other actors of the value chain (especially in consumer products and interactions with SME suppliers)



RFID Contribution to Innovation Development



- RFID enables process innovation and greater integration of value chains,
- This allow to implement innovative business models (thanks to accuracy and efficiency benefits)
- RFID enables product and service innovation (for example smart-dressing rooms in fashion retailing, drugs misuse prevention in healthcare)



RFID: Potential Impact on Employment and Workforce



- In the weighted sample, about 70% of enterprises using RFID did not reduce jobs after its introduction— but 30% did
- A minority of enterprises created new technical (22%) or business process oriented (18%) jobs
- The Case studies show some workforce reallocation to other business functions
- As for other ICT applications, successful RFID implementation requires
 - Training
 - Medium-high technical and business process oriented skills



Outlook for further developments



- Technological innovation will lead to greater integration of RFID with other technologies
 - e.g. sensor network technologies, real-time locating systems (RTLS), business intelligence systems
- This may enable innovations such as fully automated self-service stores
- Trend towards embedding RFID in products (contactless cards, exc.), and in packaging (to enable recycling)

- RFID implementation yields benefits in the efficiency of the supply chain, assets management, products/services quality
- Average payback period for RFID investments is between 2 to 3 years
- RFID leads to productivity enhancements and innovation development in most sectors
- Enterprises refusing RFID are concerned about the level of costs, the rate of return on investments, the lack of global standards



Policy Implications – Role of Policies - I



- **Build awareness** of RFID potential benefits and implications for process and product innovation
- **Promote** training and RFID **skills development** to prevent the emergence of skills gaps
- Develop a regulatory framework promoting **radio standards for the medium-long term** (present standards are too fragmented and valid only up to 10 years horizon)



Policy Implications – Role of Policies - II



- **Analyse potential environmental impacts** resulting from the diffusion of billions of RFID devices and provide guidelines (for example for **recycling**)
- Emerging wireless and universal communication scenario: possible need for **new protocol standards and interoperability guidelines**
- **Invest in EU level R&D cooperative research** for medium-long term RFID applications and innovations



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