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Digital Transformation:

Challenges and Implications for Enterprise Modeling

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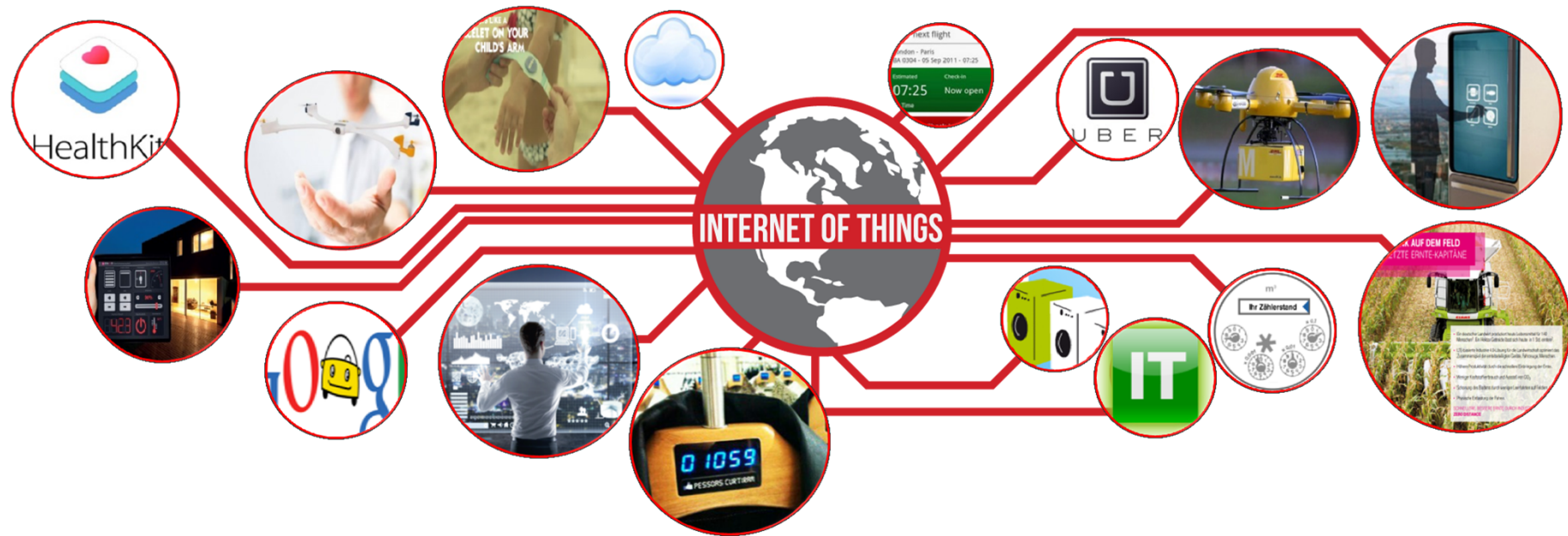
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Overview

- Short Introduction to Digitization:
Why investigate Internet-of-Things, Cyber-Physical Systems and Digitization in the context of Enterprise Modelling?
- Example for Digitization
 - Husqvarna Smart Garden
- Challenges for Enterprise Modeling
- Conclusions

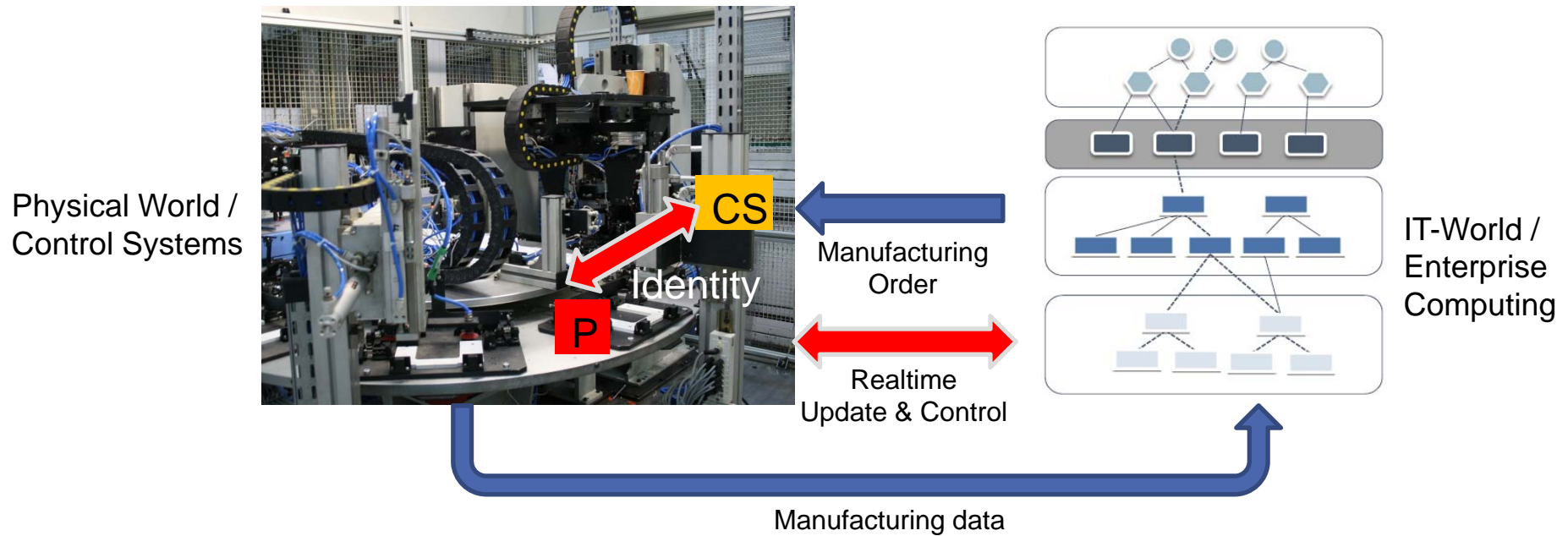
Internet of Things (IoT)

- Initially: tagging „things“ (RFID)
 - Now: „things“ are smart and interact
 - „things“ bring services
- New business models
 - Changed value creation
 - New kinds of services

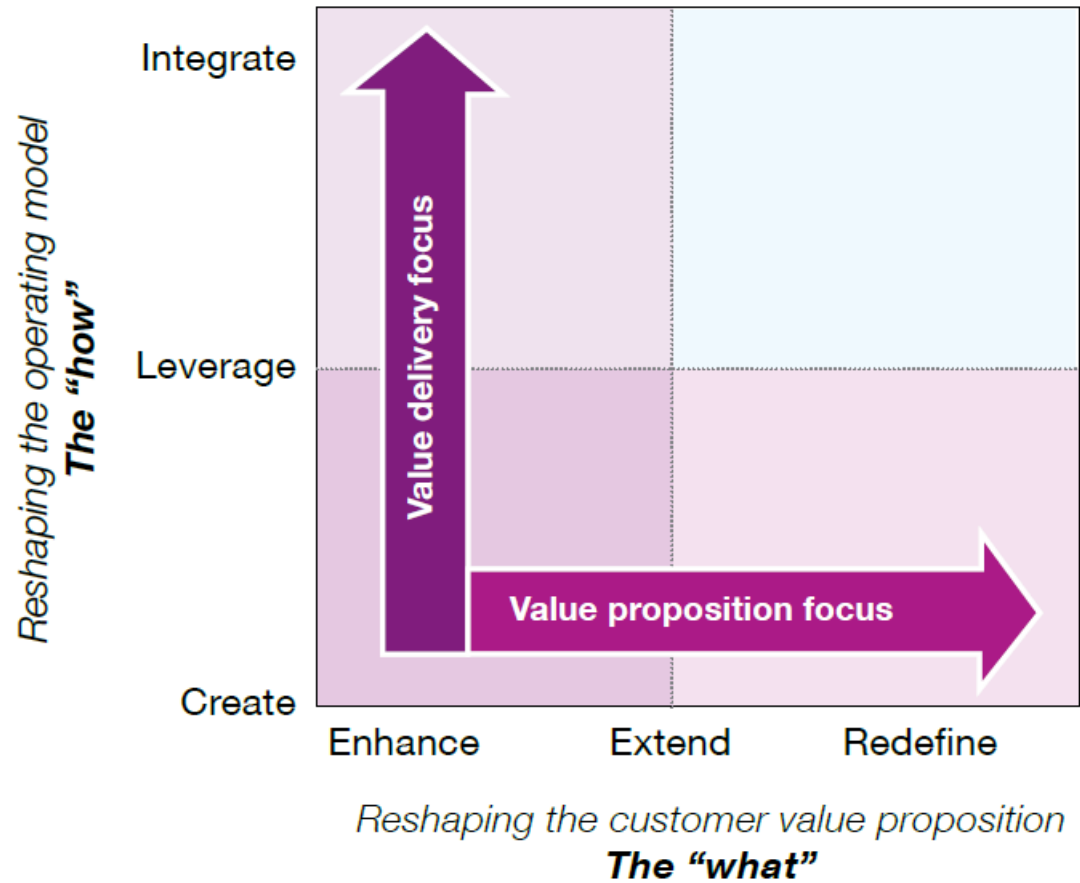


Cyber-Physical Systems and Industry 4.0

- Connect physical systems (machines, vehicles, tools) and IT-systems in real-time
- Communication, coordination and control in both directions



Digital Transformation



Source: IBM Institute for Business Value (2011) Digital transformation: *Creating new business models where digital meets physical*. Executive Report https://www-935.ibm.com/services/us/gbs/thoughtleadership/pdf/us_ibv_digital_transformation_808.PDF

Digitization: From Traditional to Digital Business Model

Traditional (physical) business models rely

- on places (such as bank branches, bookstores or department stores)
- people (such as sales teams or insurance agents) and/or
- physical products (such as cars, TVs, shampoo, or cookies)

... to delight a customer

Within an enterprise, digital business models challenge the (physical) model in three main areas:

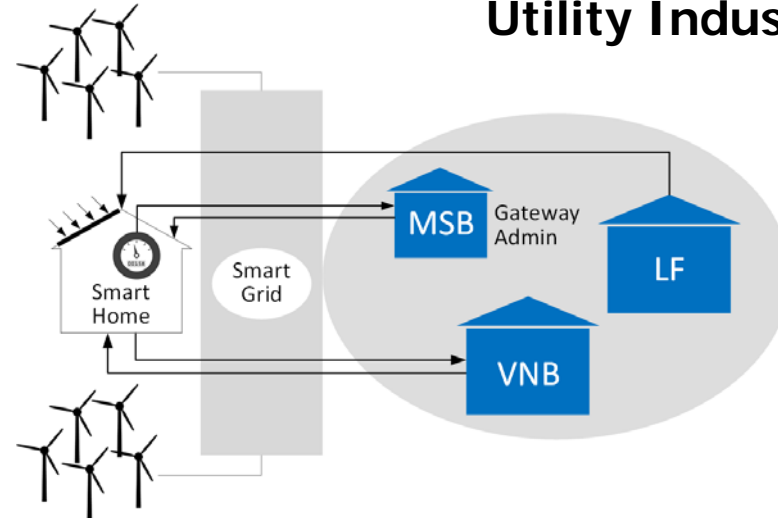
- internal power: who “owns” the customer’s experience often changes from product groups to the unit that manages the multi-product customer experience;
- business processes: require rethinking to be seamless across channels;
- customer data: become an enterprise-wide resource rather than remaining hidden in one area.

Industrial Cases of Digital Transformation

Digital Signage



Utility Industry



Financial Industry

GELDWÄSCHE PRÄVENTION	Know Your Customer	sonst. strafbare Handlungen (ssH)	
Compliance Organisation			
Geldwäsche Prävention Prozess	Know Your Customer Prozess	ssH Prozess	Compliance Funktionen Übersicht
Geldwäsche Prävention Datennutzung	KYC Datennutzung	ssH Datennutzung	Compliance Information Struktur
Geldwäsche Prävention Datenstruktur	KYC Datenstruktur	ssH Datenstruktur	Compliance Anwendung Landschaft
Geldwäsche Prävention IT-Unterstützung	KYC IT-Unterstützung	ssH IT-Unterstützung	

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Smart Garden



Courtesy of and (c) by Husqvarna AB, Sweden



Industrial Digitization Example:

Husqvarna Automower

Husqvarna Automover (lawn mowing robot)



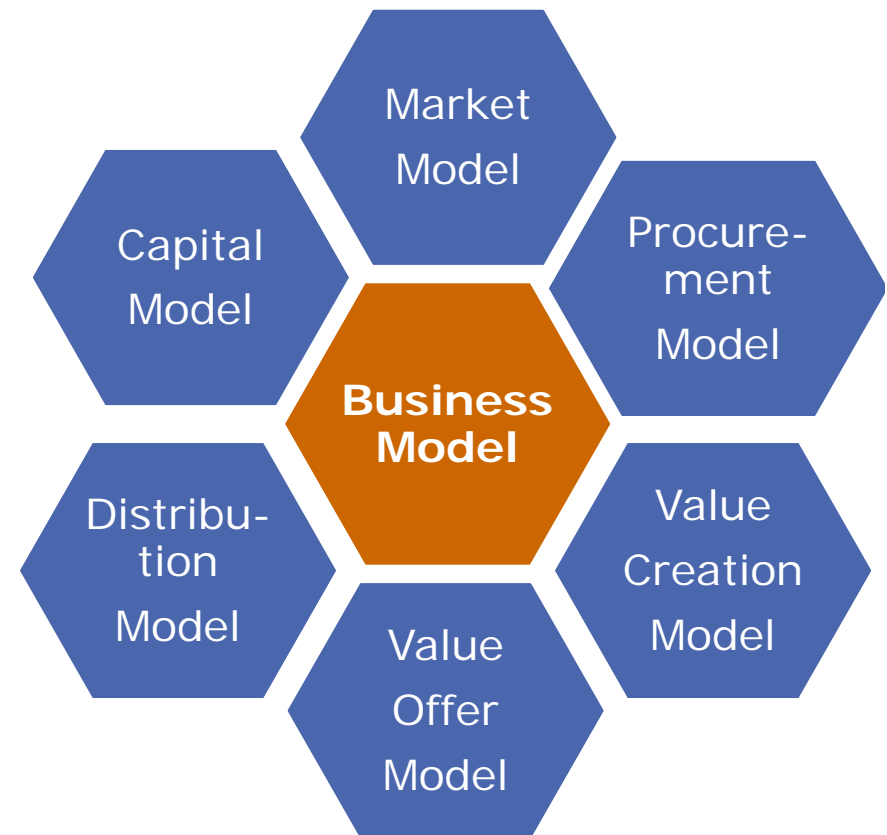
<http://www.husqvarna.com/uk/products/robotic-lawn-mowers/>



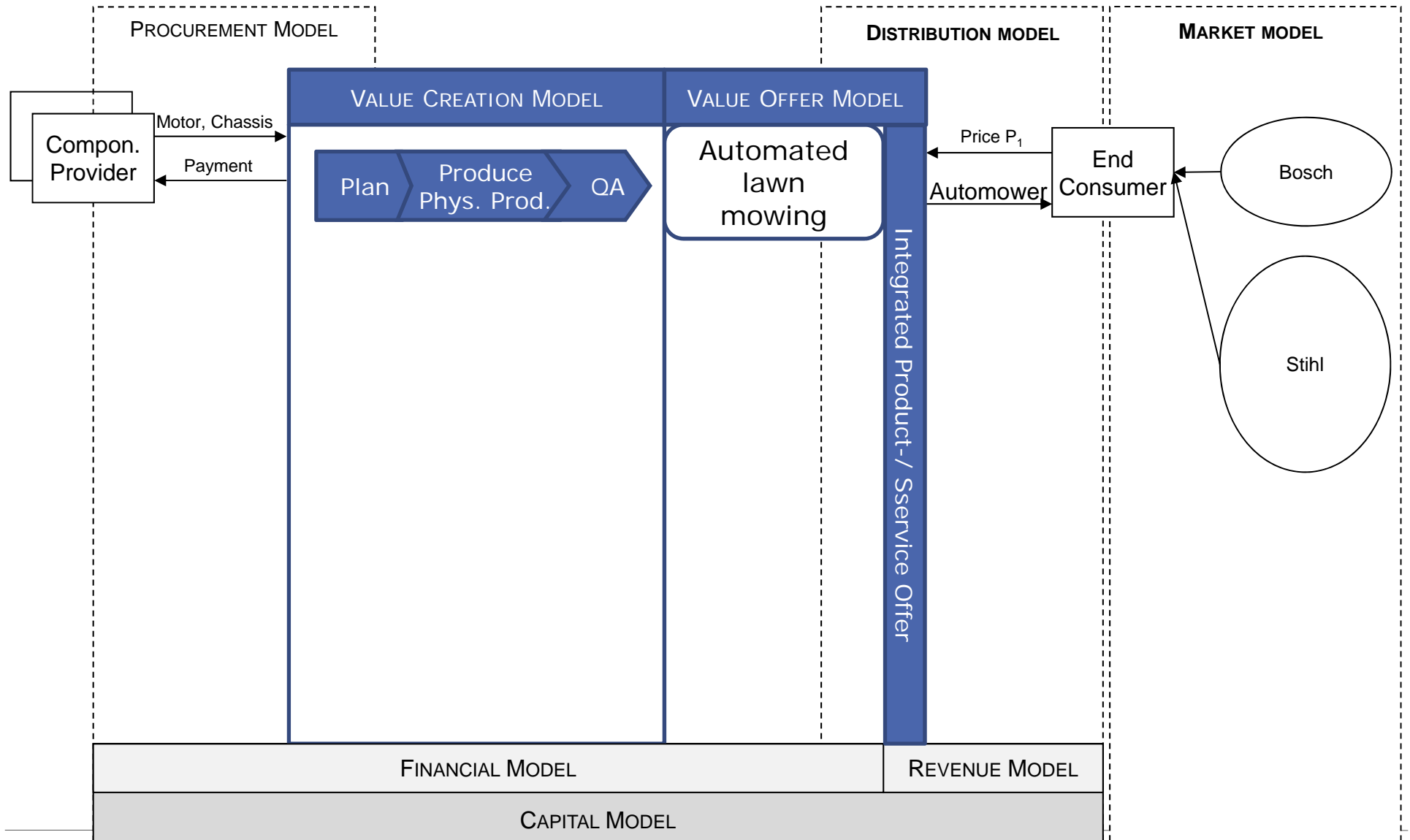
Courtesy of and (c) by Husqvarna
AB, Sweden

Business Model according to Wirtz

- **Market model:** describes the market structures incl.
 - Competitor model
 - Demand model
- **Procurement model:** What parts of the product/service are procured from external suppliers?
- **Value creation model:** How are goods and services transformed into value propositions?
- **Value offer model:** what value propositions are offered to what customer groups
- **Distribution model:** what products or services are offered to what time at what price to the customers and how are they delivered?
- **Capital model:** describes the financial resources
 - Financial model: sources of the capital
 - Kinds of revenues and revenue streams

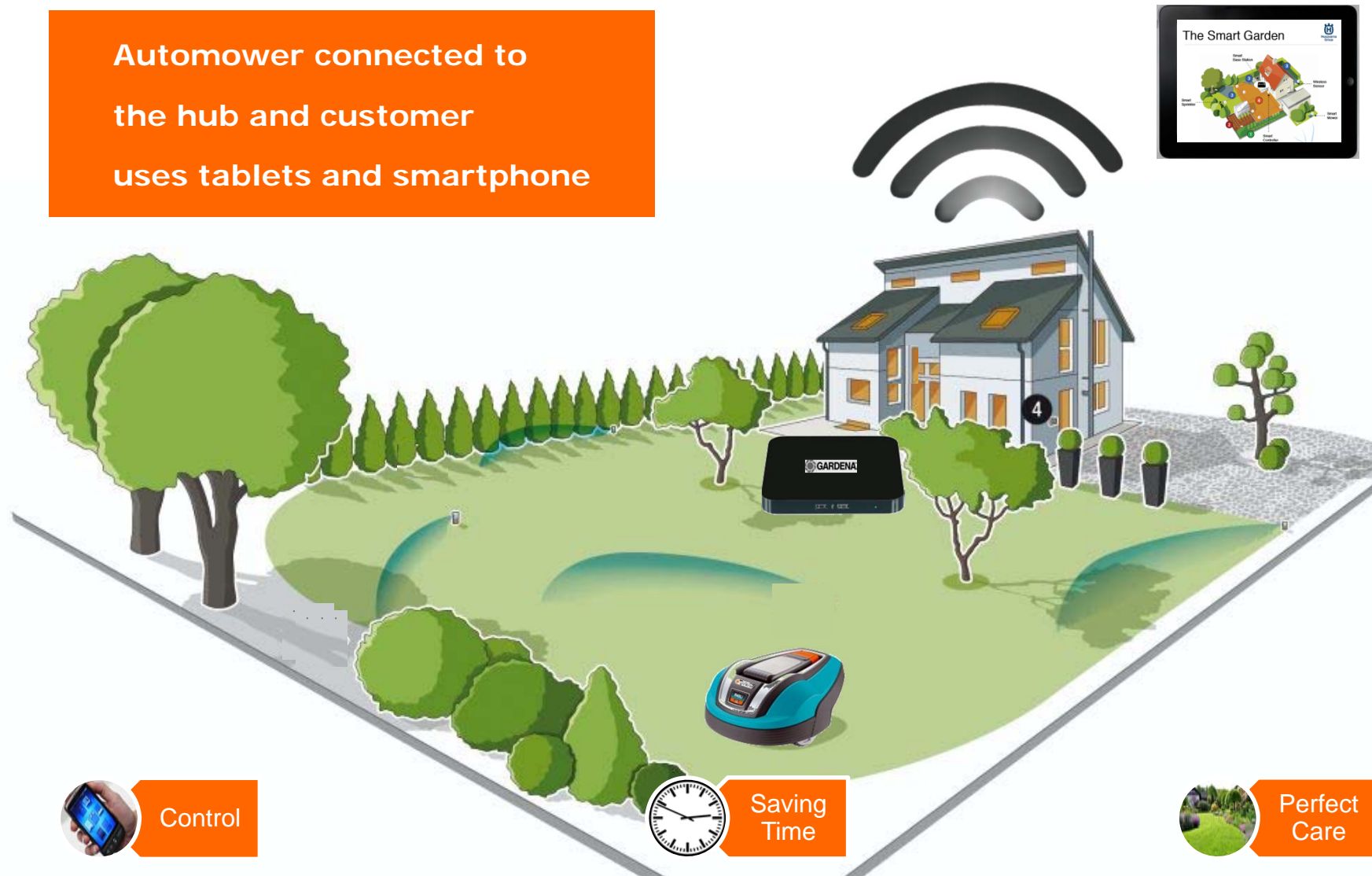


Initial Business Model of Husqvarna

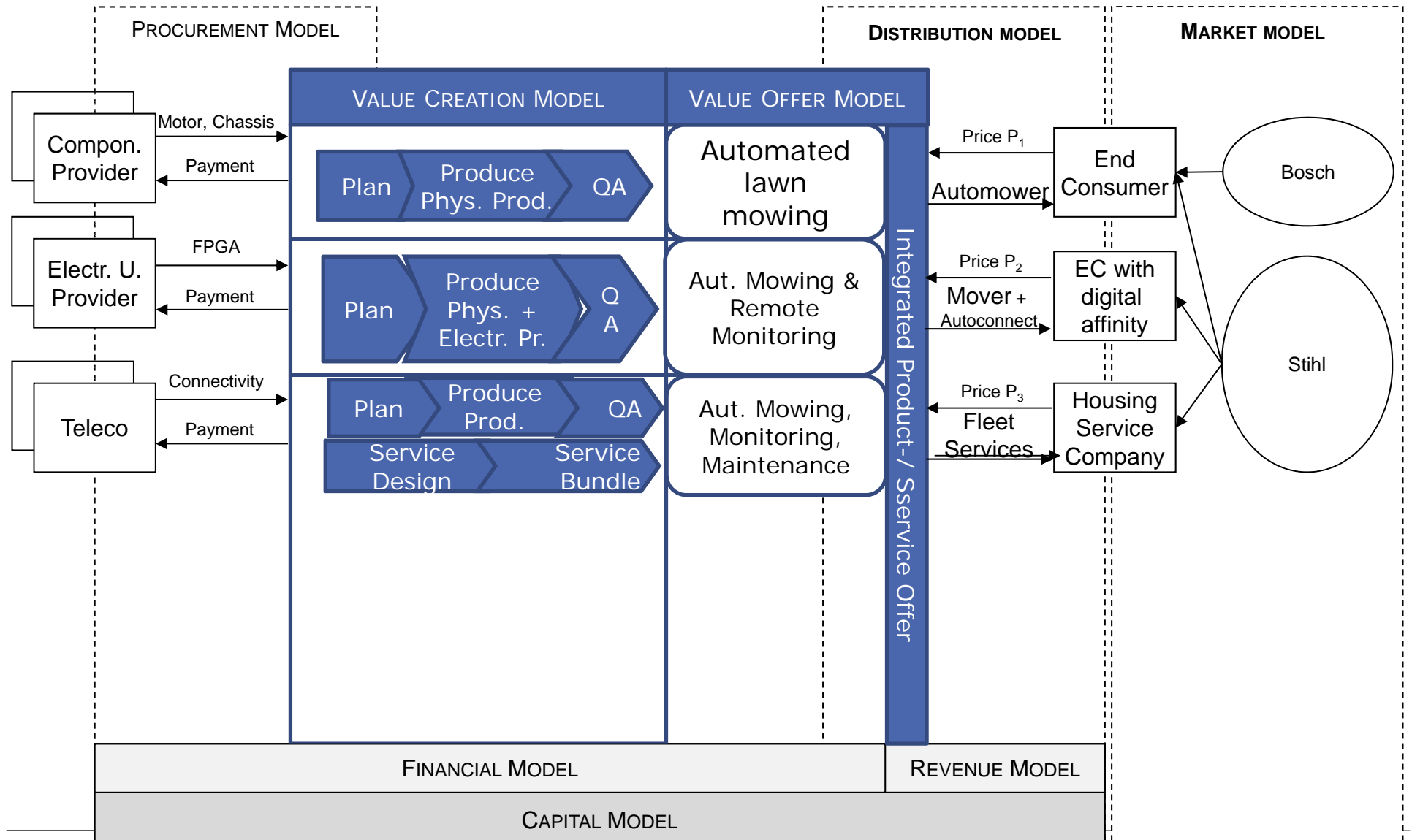


Husqvarna Digital Business Model, Part 1: Automower connect

Automower connected to the hub and customer uses tablets and smartphone



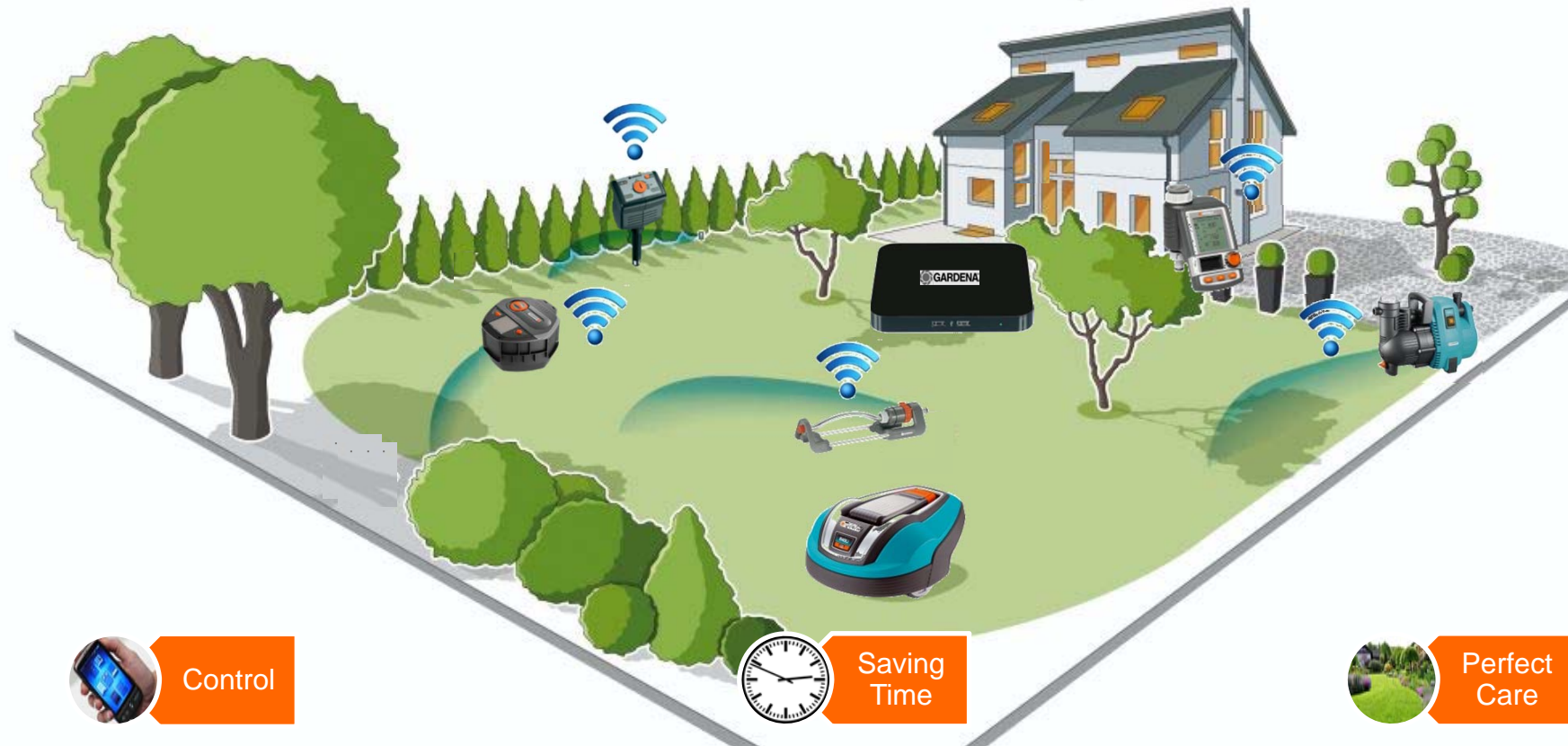
(Extended) Business Model of Husqvarna



Husqvarna (Extended) Business Model, Part 2: Smart Garden System

System structure...

All products are connected to the hub and the user can simply interact with all devices thru apps.



Control

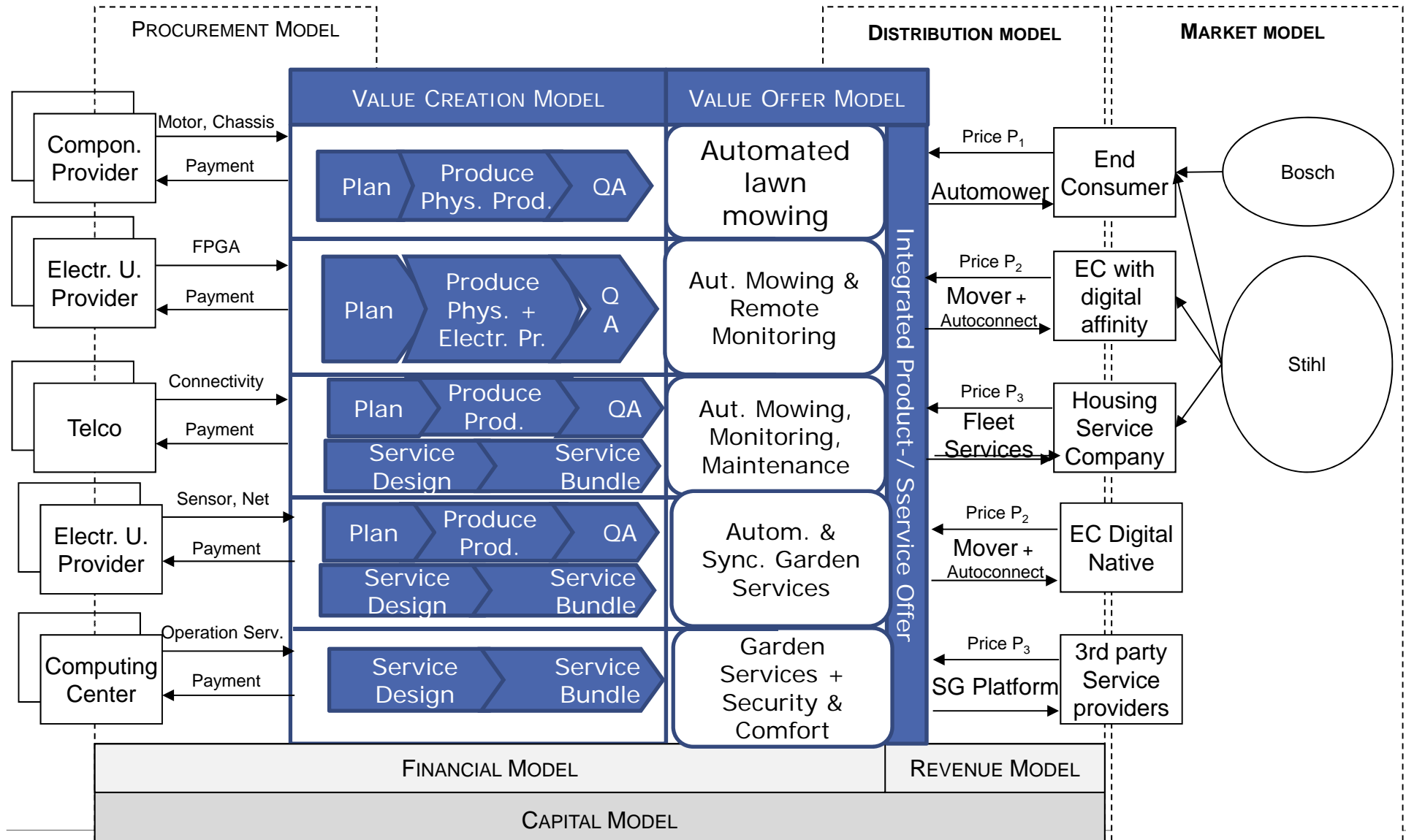


Saving Time



Perfect Care

Business Model of Husqvarna



Challenge: Product-IT and Enterprise-IT integration

Product-IT

Physical World / Systems and Infrastructure



Product-IT:

- „embedded“ in the product
- traditionally constructed separately from enterprise IT (due to reliability requirements, different lifecycle, different funding strategy, etc.)
- Connections to enterprise IT often specific „point-to-point“ solutions

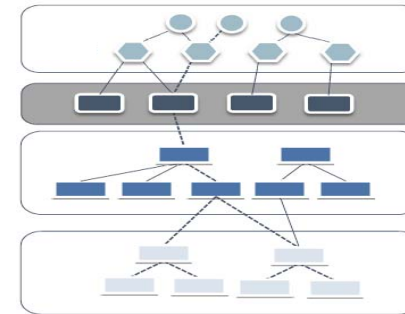


Cyber-Physical Systems
or
„Internet of Things“

CPS and IoT require interaction in real time, closer integration of product IT and enterprise IT and changes in EA

Enterprise-IT

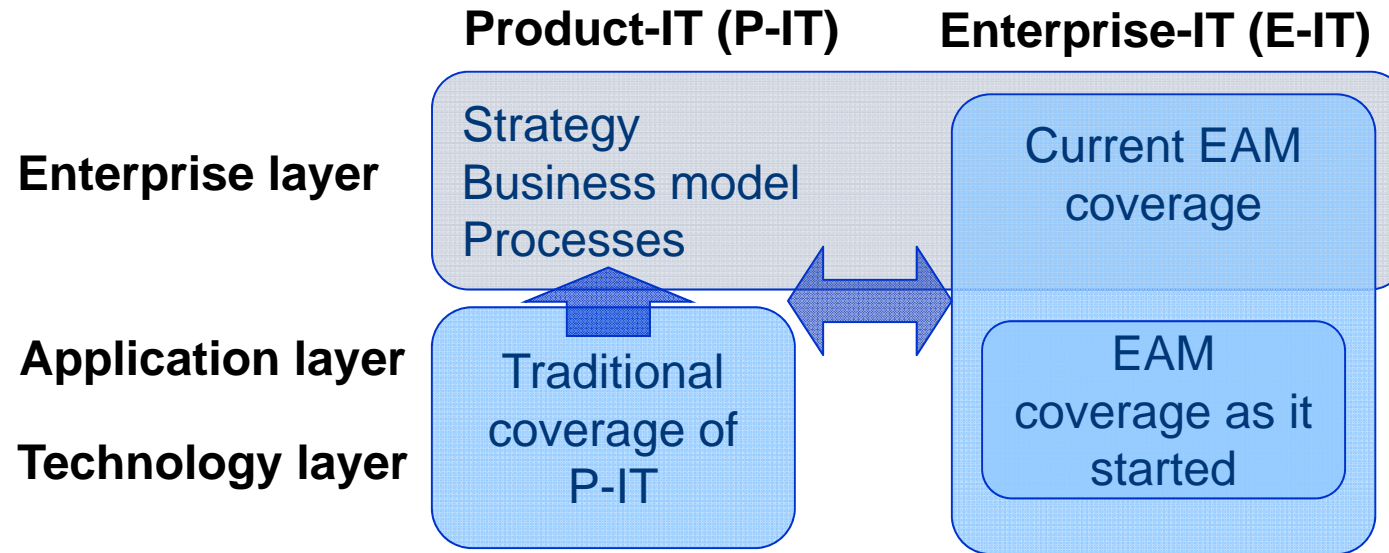
IT-World / Enterprise Computing



Enterprise IT:

- Support for value creation and support processes and functions
- Usually structured into different layers
- Currently main focus of EAM
- Product-IT usually „out-of-scope“ for enterprise IT

Product driven EAM



Bimodal processes

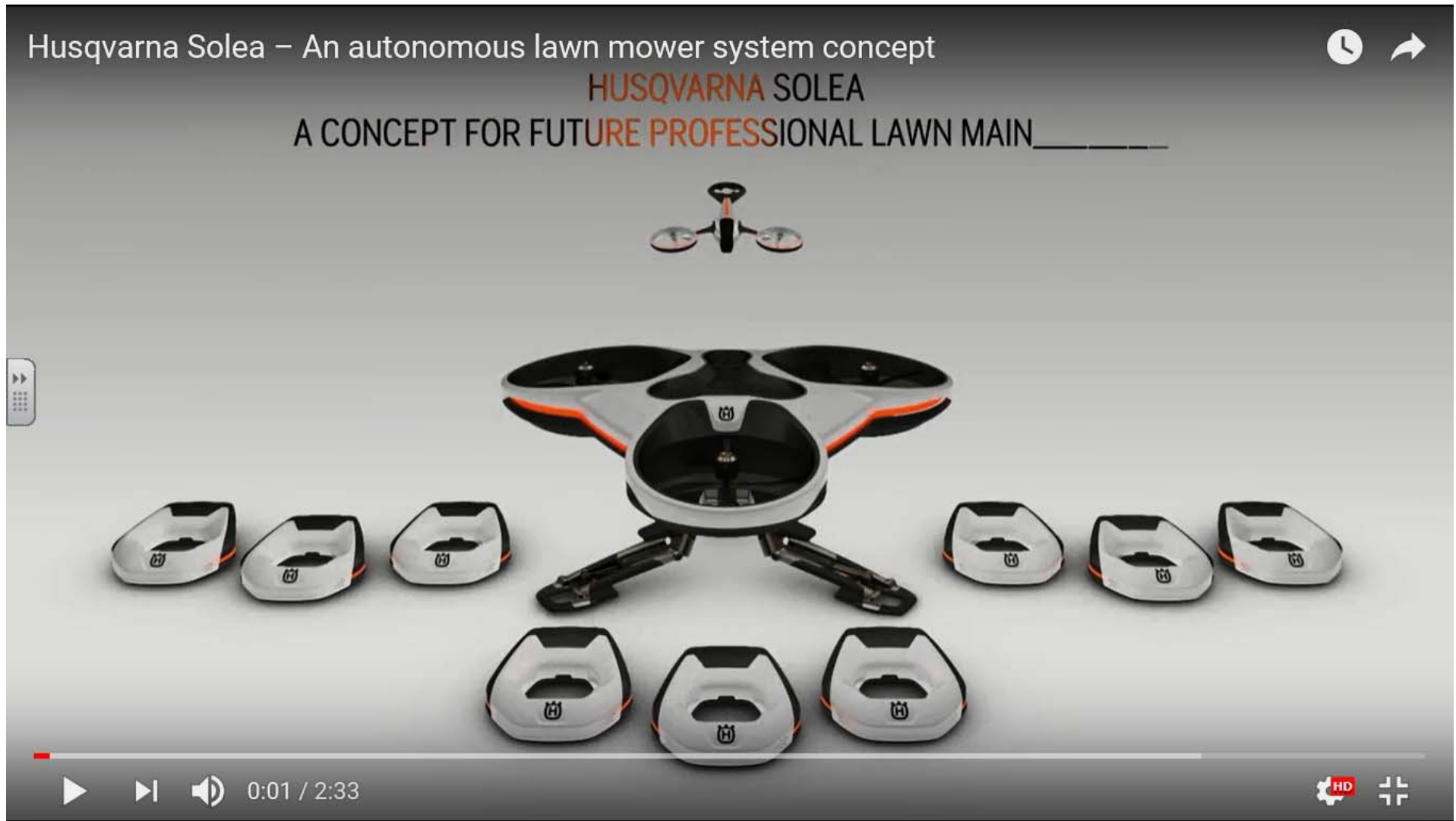
Mode 2, requires:

- fast turnaround
- frequent update
- rapid path

Mode 1, designed for:

- stability
- efficiency
- low cost
- traditional EAM

Husqvarna (Extended) Business Model, Part 3: SOLEA



<https://www.youtube.com/watch?v=rp0npJDS0s8>

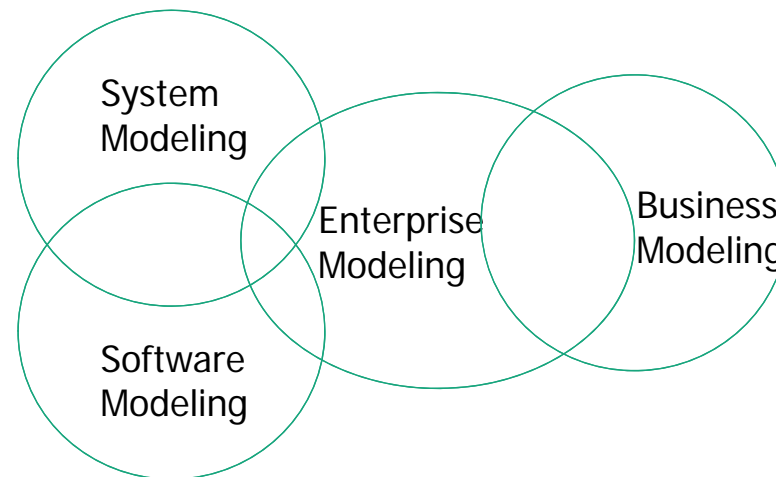
Courtesy of and (c) by Husqvarna AB, Sweden



Implications for Enterprise (Architecture) Modeling

Implications of Digitization for Enterprise Modeling

- Enterprise Architecture is changed on several layers by digitization
- Enterprise Models can serve as „glue“ between other model types



- Business Model can be captured in an enterprise model

More Implications for Enterprise (Architecture) Modelling

- We have to integrate Product IT into Enterprise Architecture Models
 - The process, roles and principles for synchronizing Product-IT and Enterprise IT need to be redefined
- Different „paces“ in Product-IT and Enterprise-IT development will lead to different granularities and update cycles in enterprise models
- Highly dynamic situation in the field
 - What has to be part of the model, what should be excluded?
 - Potentially incomplete and quickly changing models

More Implications for Enterprise Modeling

- Model the product and service structure
 - Understand dependencies between process and product/service
 - Identify usage contexts of products/services and influences on processes
- Model the customer-side of services
- Integration of design-time and run-time
 - Design depends on real-time context, and context is affected by design

Conclusions

Digitization, CPS and IoT will not just pass or go away. These trends are affecting enterprises and thus also affecting Enterprise (Architecture) Modeling

Implications

- Let us share experiences on IoT, CPS and Digitization projects or cases!
- Let us find ways to better support agility in enterprises
- Let us take the lead in modelling support for IoT, CPS, etc.

Thank you for your attention!

Time for questions!