



Artesis

**Motor Condition Monitor
(MCM);**

**Academic Research,
Innovation and
Entrepreneurship**



1998
TÜBİTAK-TTGV-TÜSİAD
TECHNOLOGY GRAND AWARD



WINNER
2000
CONTROL
ENGINEERING
EDITOR'S CHOICE AWARD

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www.artesis.com

SUGGESTIONS



Patent Number:
US6014598
TR1998/02541B

Innovation provides substantial opportunities. It is also needed for the well being (and even independence) of our country

Involve in a process leading to innovative business

Establish effective lobby activities for government and YOK to provide incentives for innovation



Contents



Patent Number:
US6014598
TR1998/02541B



Artesis

Innovation, obstacles and
entrepreneurship

Idea; R&D; Industrial incubation

Product; Whole product; Crossing the
Chasm

Management; Focused? Capable?

Establishing sales channels;
Strategic partnership with GE

Innovation, Obstacles and Entrepreneurship



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On average start-up businesses with good ideas, good plans and capable people succeed only one in ten times

<u>Individual Event</u>	<u>Probability</u>
Company has sufficient capital	80%
Management is capable and focused	80%
Product development goes as planned	80%
Component sourcing goes as planned	80%
Competitors behave as expected	80%
Customers want product	80%
Pricing is forecast correctly	80%
Patent are issued and are enforceable	80%
COMBINED PROBABILITY OF SUCCESS	

17%

Innovation, Obstacles and Entrepreneurship



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Idea (Achievable? Technology?
Protectable?)

Product (Capital? Development?
Production? Component Sourcing?)

Added Value to Customer (Needed?
Competition? Price?)

Profit (Cost Effective? Marketing channels?
Management?)

A capable entrepreneur converts the idea into a product that provides added value to customers and a high return on investment.

Expertise



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System Identification, Structure
Estimation, Observability Indices

Modeling, Minimal Parameterization,
Alpha Canonical Form, Dead Beat
Observers

Fault Parameters, Signal Processing

SSME(NASA), Gas Turbines (P&W),
Helicopter Engines (US Army)

Consulting at Arcelik

Idea



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What problems exist for my expertise?
Relevant? Market Size?

Condition Monitoring of electric motor
driven machinery?

Billions of them everywhere in industry

Partnership with Arcelik (A step by step
process)

Idea



Achievable → SSME, Helicopter Engines, Jet Engines

Technology → Producible

Protection → Broad patents in TC, USA, EU and other countries

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Product



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Capital; Industrial Incubation at Arcelik

Development; 9 Yrs including field testing

“Get product specification and value proposition from S&M before developing a product”

Production; outsource, in-house quality assurance

Component Sourcing; components need to be updated continuously

Product: MCM



MCM, Motor Condition Monitor, is a product that identifies existing and developing faults on electric motors and their driven equipment by measuring the current and voltage signals from the electrical supply to the motor.

It is permanently mounted, generally in the motor control center and is applicable to 3-phase AC, induction or synchronous, fixed or variable speed motors.

Accompanying MCM Software is used to view the MCM provides both mechanical (unbalance, misalignment, roller bearings, etc.) and electrical (loose windings, short circuits, etc.) anomaly detection as well as electrical parameters such as voltage and current imbalances and power factor.

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Product; MCM (Motor Condition Monitor)



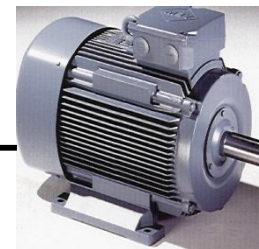
Early Fault Detection
Diagnostics
Energy Quality and Consumption
Effectiveness of Maintenance
Equipment Availability

MCM monitors electric-motor based machines continuously measuring currents and voltages only.



- The measurements and results are stored in a database on a remote PC for remote monitoring and trend analysis.

- STOP
- PERFORM MAINTENANCE
- WATCH LOAD
- WATCH LINE
- OK



- MCM can be installed on motor control panels.
- MCM is easy to install

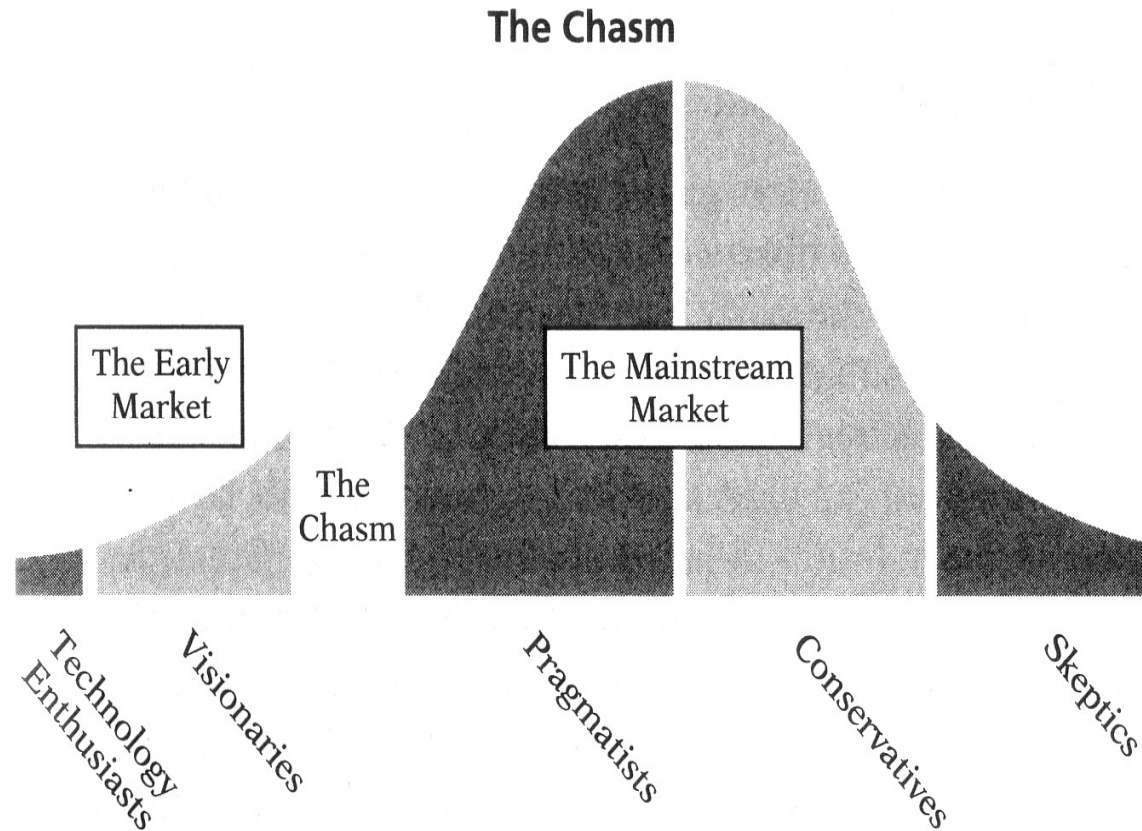
Whole Product and Crossing the chasm



Geoff Moore



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WHOLE Product



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the whole product is defined as *the minimum set of products and services necessary to ensure that the target customer will achieve his or her compelling reason to buy.*

the only safe way to cross the chasm is in fact to put all your eggs in one basket.

That is, the key to a winning strategy is to identify a single beachhead of pragmatist customers in a mainstream market segment and to accelerate the formation of 100 percent of their whole product

WHOLE PRODUCT



Artesis offers a turn-key system package including MCM/PCMs, AES, sensors, integration to SCADA, HMI, Asset Management and Reporting Systems, commissioning and one year remote monitoring service.

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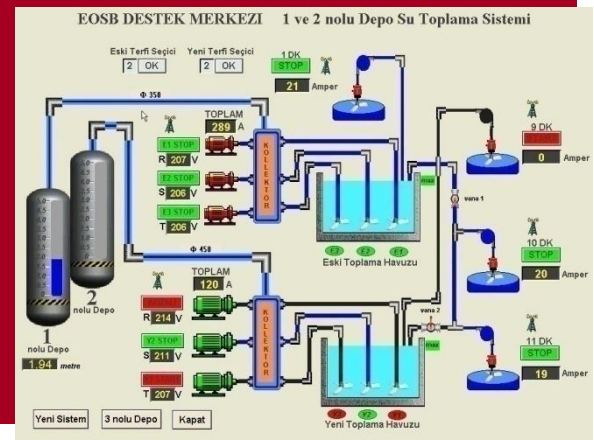
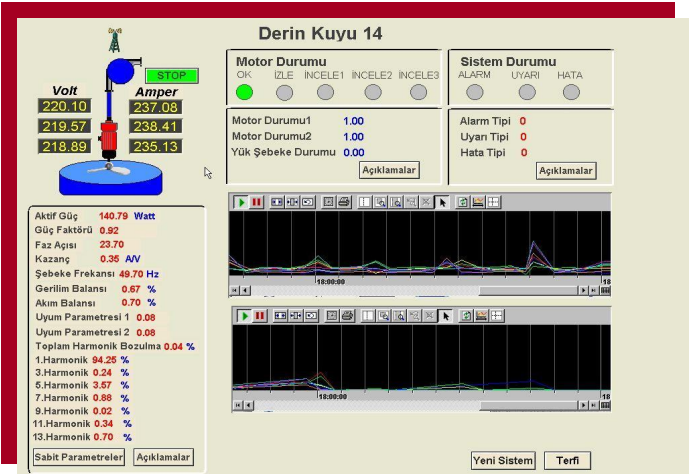
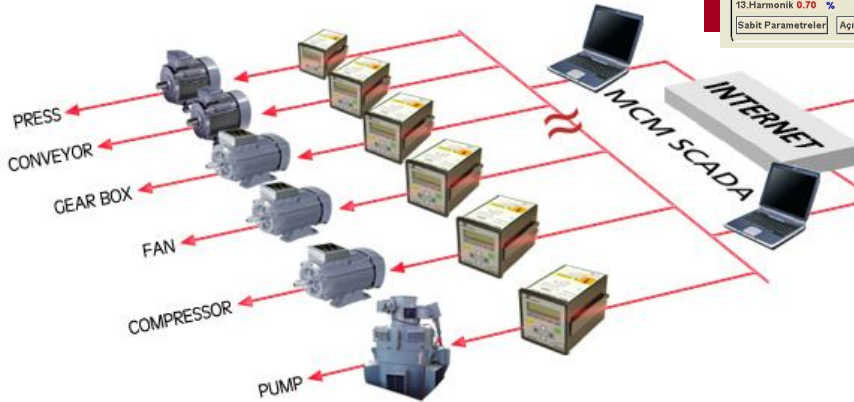


Remote Monitoring



Communication with MODBUS

Integration with other SCADA and Automation Systems



Value Proposition



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Competitive business environment and lower profit margins forces companies to increase productivity and to get the most out of existing equipment and machinery

The value proposition is to help improve productivity and Energy efficiency by reducing unexpected downtime and faulty operation of equipment as well as help production and maintenance scheduling.

“ Value proposition is vague”

Market Size and Challenges



Market: 80 million motors / yr, 2 billion motor park

MCM targets 0.1 % of this market

Challenges in establishing marketing channels and after sale support

“Excellent research people, no experienced S&M people for innovative technology products”

Artesis LLP, UK

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Key to Success



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The ingenuity of sales & marketing people in defining the “whole product” and establishing marketing channels is necessary

Partnership with a company like GE with established marketing channels will accelerate market penetration

Recognition



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1- Grand Technology Award, TÜBİTAK, TTGV, TÜSİAD, 1998, Turkey

2- 40 Best Products, Editor's Choice Award, Control Engineering Magazine, 2001, USA

3- Innovation Award for "Simplifying Predictive Maintenance", The Institution of Engineering and Technology, 2007, UK

4- 2008 Endeavor Turkey Girişimcileri, Artesis, Ahmet Duyar "Elektrikli motorlar için Önleyici bakım ve tamir çözümleri", June 2008 Türkiye

5- Global condition Monitoring Equipment Product Line Strategy of the year award, Frost Sullivan, November 2008, USA and UK

References

Water	Petrochem
	
Energy	Pharmaceutical
	

References

Metals



Food and beverage



Driveline and Chassis Technology



Automotive



Transportation



PRINCESS CRUISES
escape completely



MAERSK



Babcock
Airports

SUGGESTIONS



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Imagination, Homework, Patience



Model Based Fault Detection

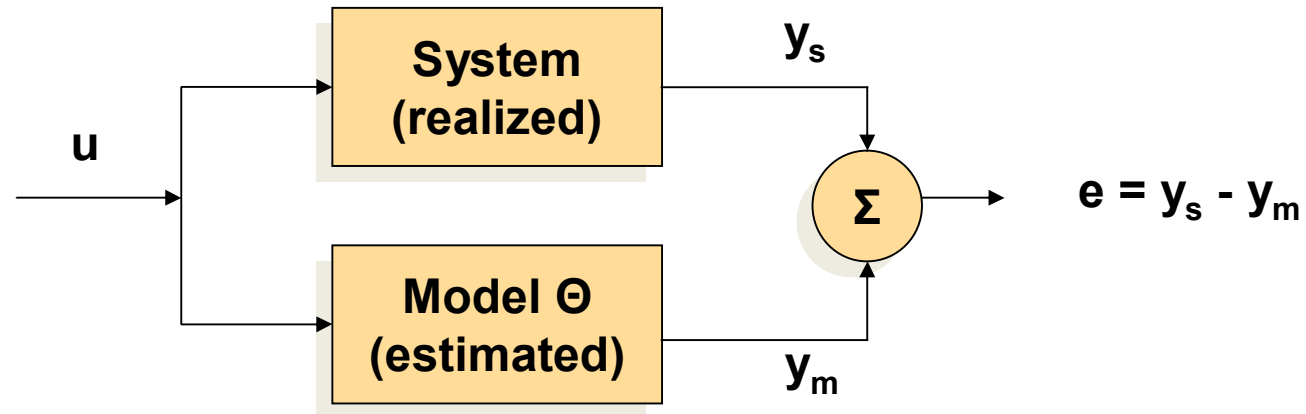


Machine
Profile

Change in
Profile

Fault
Warning

Diagnosis



- MCM determines the model and profile (parameters) of electric motor-based systems under normal operating conditions
- These parameters are then used to estimate the system output.
- If the system outputs do not fit with the estimated values, then it gives warning.
- The faults are identified by examining the differences in the system profile.