It’s time to change!
Leveraging External Knowledge

KOITA Global Forum 2016
Seoul, Korea

October 2016

Presented by Dr. Sam Kogan, CEO
skogan@gen5group.com

21st Century Innovation Strategy

Old Paradigm

Linear relationship between subject matter expertise and innovation capability

New Paradigm

Non-linear – Discontinuity between knowledge expansion and innovation success

Business goals haven't changed . . .

- Return to Investors
- Profit
- Revenue growth
  - Maintaining core competencies
  - Gaining competitive advantage
  - Retaining talent
  - Etc.

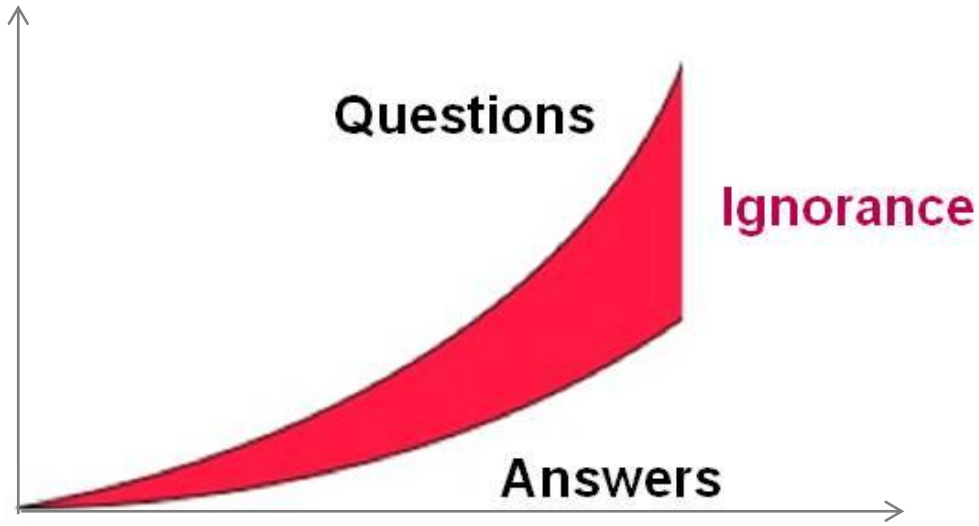
It always has been, and always will be, about finding the net

. . . but business realities have!

- Complete transparency
- Disruptive technologies
- Shifting consumer behaviors
- Business model innovations
- Growing sustainability dimension
- Ubiquitous knowledge

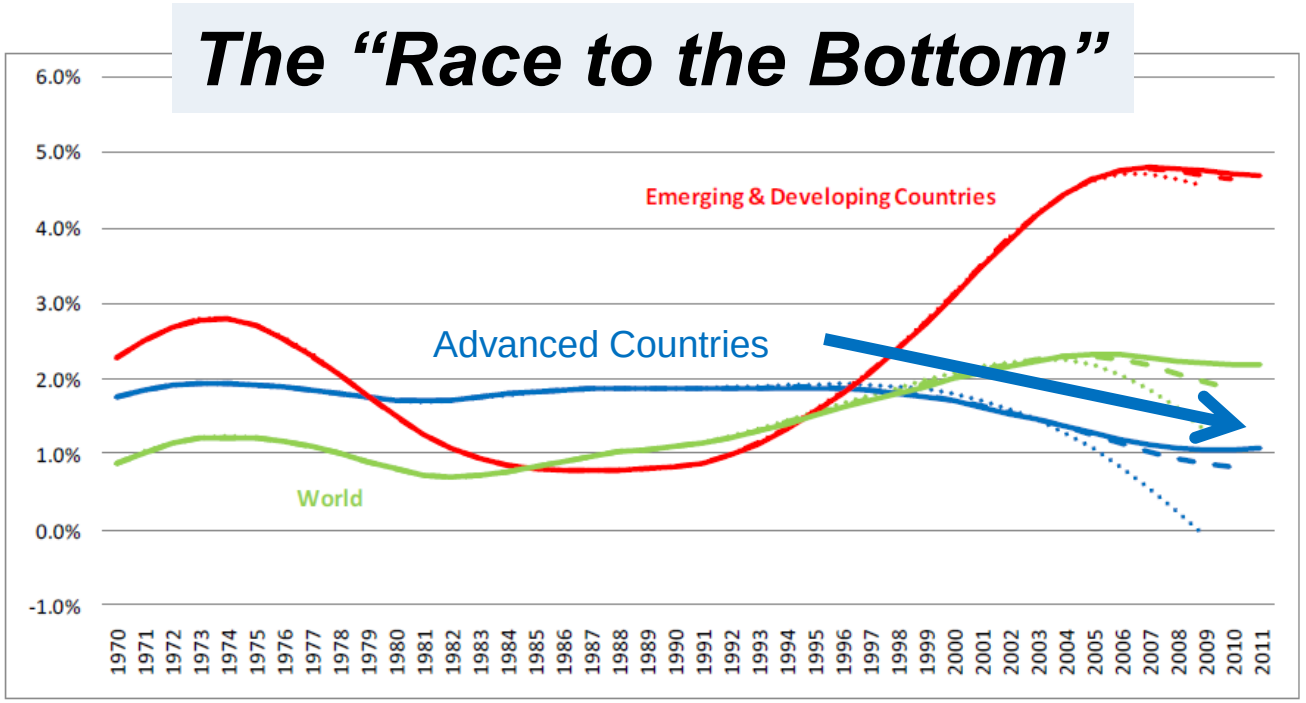
We live in a different world

- Knowledge is growing exponentially…but so is our "ignorance"



And, while world is changing, . . .

. . . even the most innovative companies are reaching the limits of productivity improvement



Source: The Conference Board Total Economy Database, January 2011
http://www.conference-board.org/pdf_free/economics/TED.pdf

You are not alone . . .

Every global company faces a similar set of challenges:

- Understanding and anticipating the needs of more demanding and knowledgeable customers and consumers
- Finding, hiring, and retaining the **right** talent (not just “the best” talent)
- Integrating knowledge and expertise from cross-specialty **internal** teams
- Tapping into and leveraging **external** global knowledge in a timely and efficient way

But, have we heard this before?

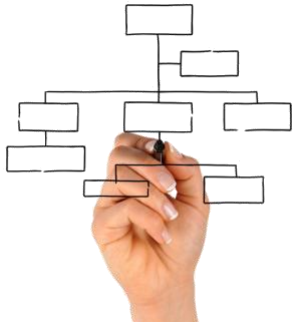
" We've moved into a new, era where innovation and expertise extend beyond the corporate R&D center.

Open Innovation is the key to solving today's innovation challenges . . . "

So, why hasn't it worked?

- **You cannot win the lottery more than once (if ever!)**

- **Throwing more darts is not going to help** ***(You cannot boil the ocean before running out of time, money and patience)***



- **It's not a job for some, but a skill for everybody!**

An alternative approach

Two essential ingredients:

Leverage

People generally accept the premise that success is tied to effectively leveraging external knowledge, resources, and solutions

Focus

But, to make it work, companies must focus limited resources to deliver predictable and repeatable outcomes

An alternative approach

One outcome of a systematic approach, is to achieve greater **focus** at each stage of the innovation process

Right Target – *Do we understand the most important sources of customer value?*

Right Altitude – *Should we address this problem at the system level, component, or sub-stem level?*

Right Problem – *Do we understand what is the problem we are really trying to solve?*

Right Solution – *Do we understand where to look to find enabling technologies and/or leverage existing solutions?*

EXAMPLE: Water Heater

Business Objective: Gain market share by decreasing boiling time from 1'15" to 50"

Conventional Approach

- Leverage expertise in water heaters, e.g.,
  - Make heater bigger
  - Put more power
  - Use noble metals
- Leverage marketing expertise
  - Hire movie stars to promote existing product
  - Commission a study proving that boiling water for more than 1' good for your health
- Work harder…..

EXAMPLE: Water Heater

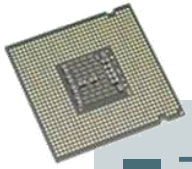
Business Objective: Gain market share by decreasing boiling time from 1'15" to 50"

Alternative Approach

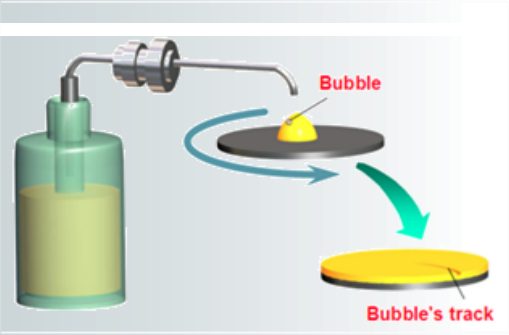
- ✓ **Right Target**
  - Improve convenience?
  - Reduce cost?
  - Shorten boiling time?
- ✓ **Right Altitude**
  - Device and cup?
  - Device shape/size?
  - Wires, coating?
- ✓ **Right Problem**
  - To increase thermoconductivity
  - To to remove bubbles
  - To create gradient of temperature?
- ✓ **Right Solution**

Outcome: boiling time was reduced to 40"!

EXAMPLE: Chip Manufacturing

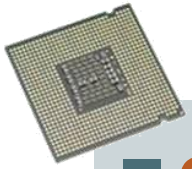


- The firm: A major computer chip manufacturer
- The issue: A photoresist polymer bubbles when applied to the wafer; *losses amount to $1M/day*

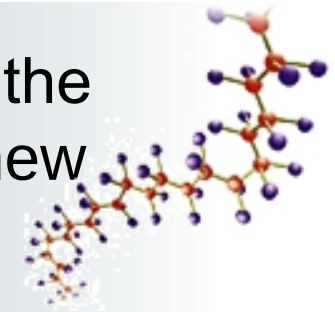


- **Conventional approach:** Looked at every possible cause using a common “manufacturing language;” tried to translate knowledge from solving problems in similar processes toward the issue
- **Result:** Their best “translators” (manufacturing engineers) could not find the source

EXAMPLE: Chip Manufacturing

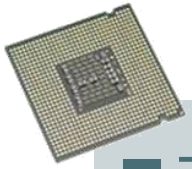


- **Conventional approach 2:** tried to “translate” the knowledge of the best *polymer* scientists into new practice



- Proposal of polymers researchers
  - Timing: 2 years
  - Research Fees: $3 million
- But the ferocity of the competition and the relentless demand to be “better and faster” did not make this a viable option.

Reformulation into a Function-Based Language



- Translation: from an object-based language (polymer science) to a function-based language.

- Reformulated problem statement: the issue is with a gas; our goal is to eliminate gas from a liquid

- Question: Who knows how to deal with gas in a liquid?

Carbonated beverage industries

Blood transfusion experts

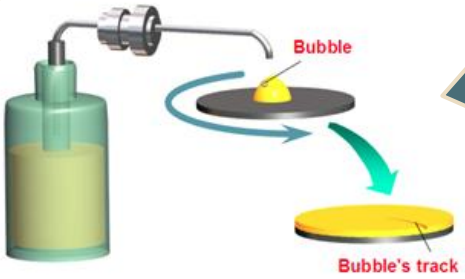
Scuba diving experts

Champagne producers

- There is an extensive body of knowledge; our goal is to *translate it to chip production*

So how did we solve it?

High-level problem: How can we prevent unexpected batch losses in our chip manufacturing process?



Specific problem: Bubbling in a thin film polymer layer. A polymer problem?

Generalized Function: Gas in a liquid

The solution was found in the Champagne industry

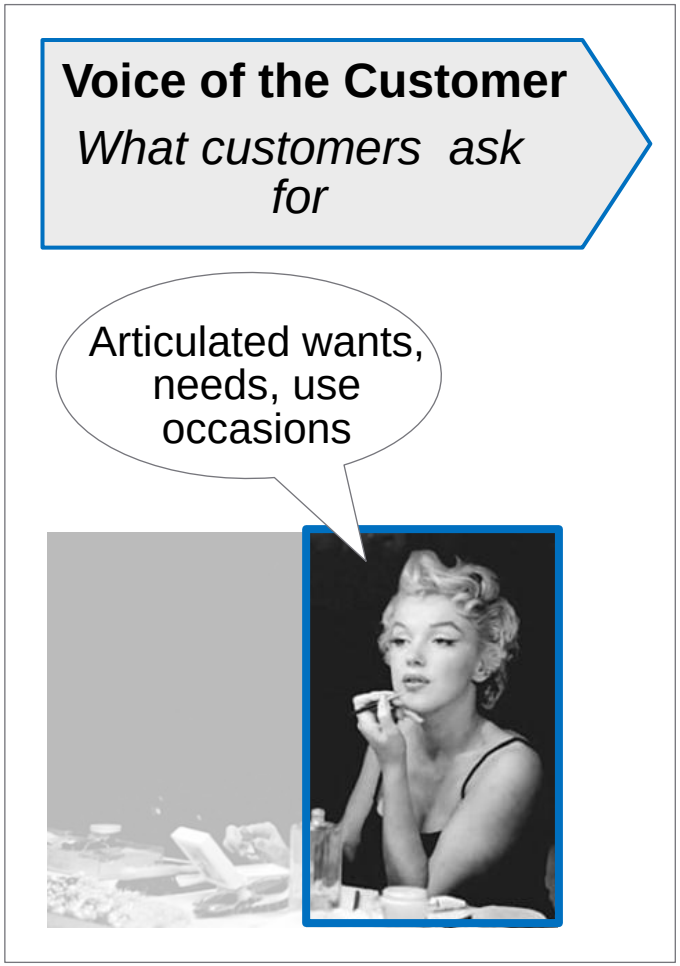
Function Oriented Search: Managing gas in a liquid; bubbles

It's not about Art, but about Applied Science

	Tool/Concept	Elaboration
Right Target	**Voice of the Product**	• Analyze the system to uncover unexploited new sources of customer value
	Development Potential	• Do not invest heavily in performance improvement if a technology is at or near its theoretical limit; Apply mathematical modeling to assess potential
Right Altitude/ Right Problem	**Cause-effect Chains**	• Systematically portray cause and effect relationships within a system to search for deeply embedded root cause problems to solve
	Function Analysis	• Model a system in terms of its functional interactions to uncover new insights for problem solving and to build a roadmap for external search
Right Solution	**Technology Trends**	• Anticipate how a technology will evolve based on objective trends; focus innovation efforts as far forward as possible into the future
	Function-oriented Search	• Use general functions to guide external search for enabling technologies and solutions that have been applied to functionally-similar challenges

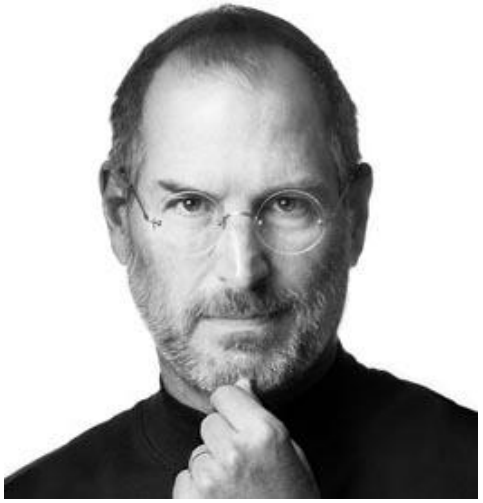
Today's session will focus on Voice of the Product

Right Target – Innovate only against Main Parameters of Value



- Qualitative interviews
- Quantitative market research
- Ethnography
- Conjoint analysis
- etc

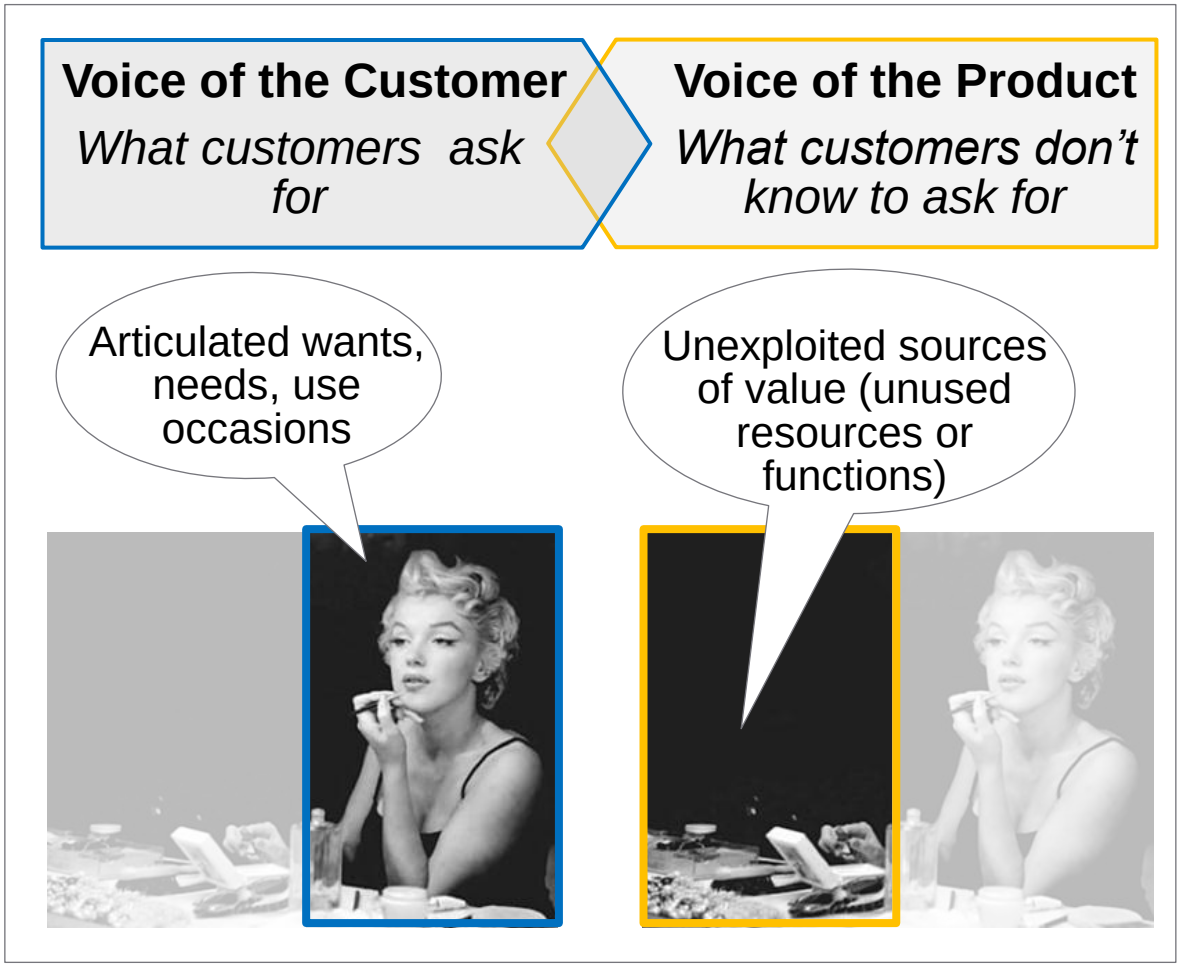
Right Target – Innovate only against Main Parameters of Value



"A lot of times, people don't know what they want until you show it to them."

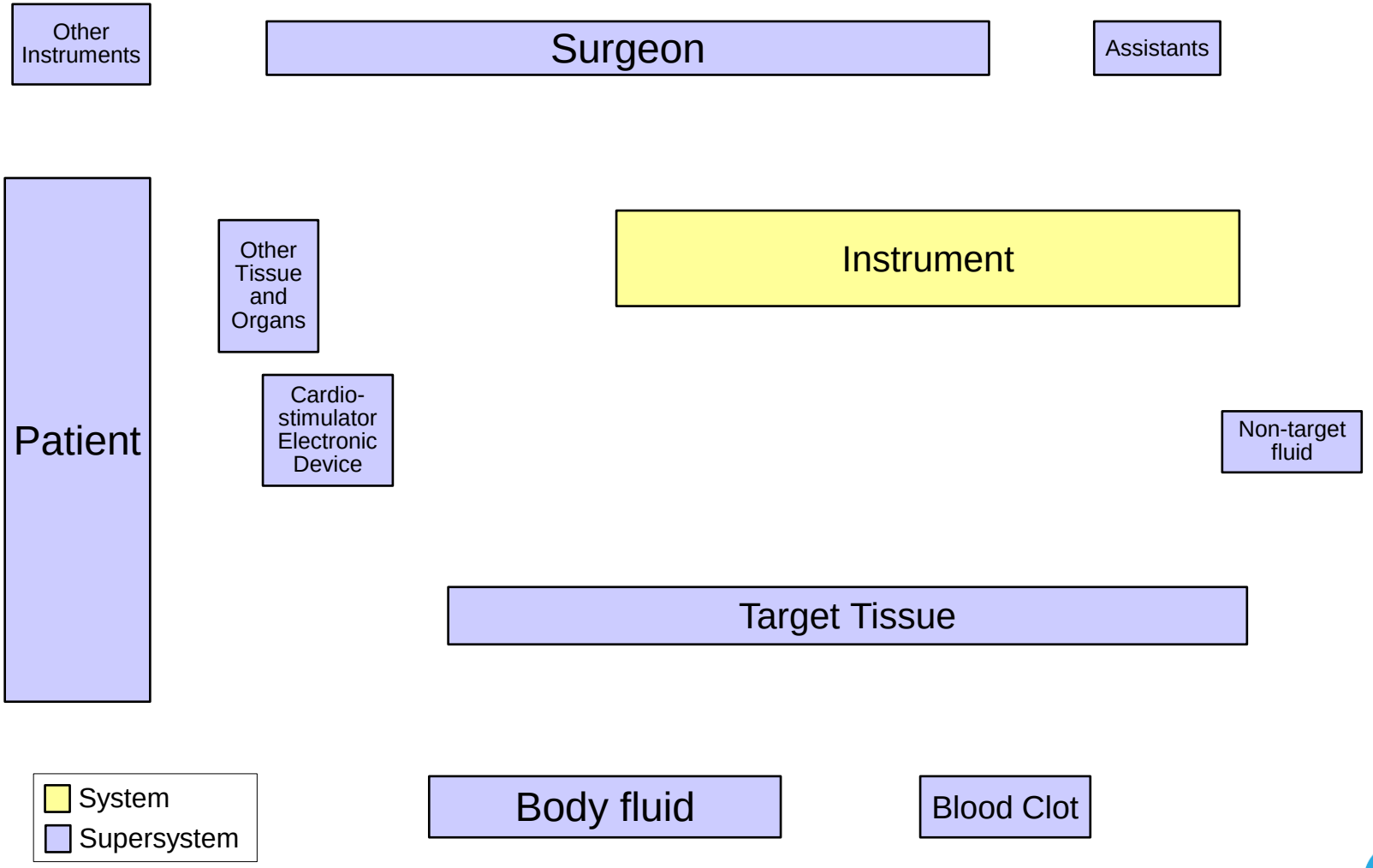
Steve Jobs

Right Target – Innovate only against Main Parameters of Value



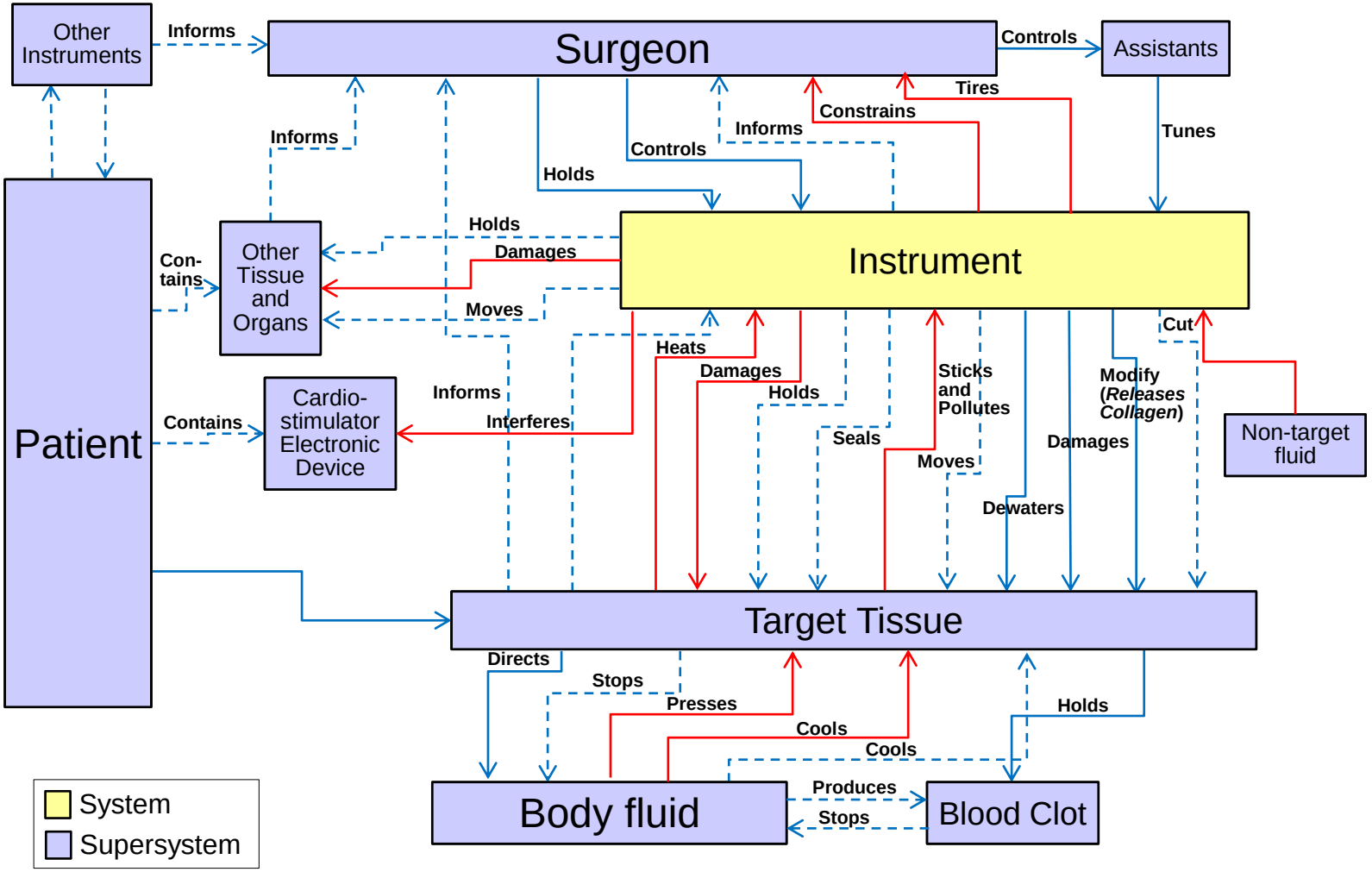
Right Target – *Finding new sources of customer value*

1. What elements of the supersystem should define the opportunity space?



Right Target – *Finding new sources of customer value*

2. What are the functional interactions among these components?

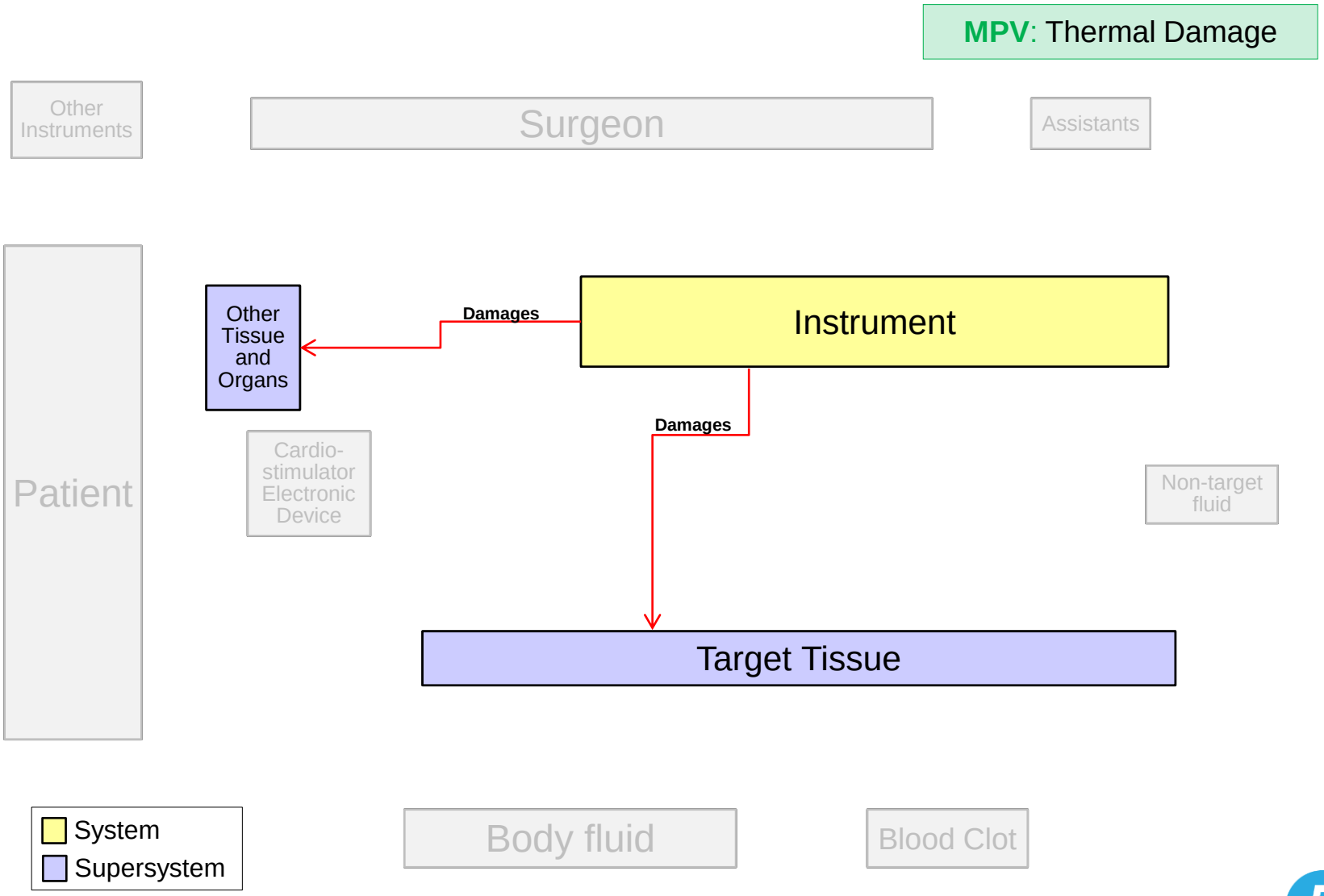


Right Target – *Finding new sources of customer value*

What are the MPV's?

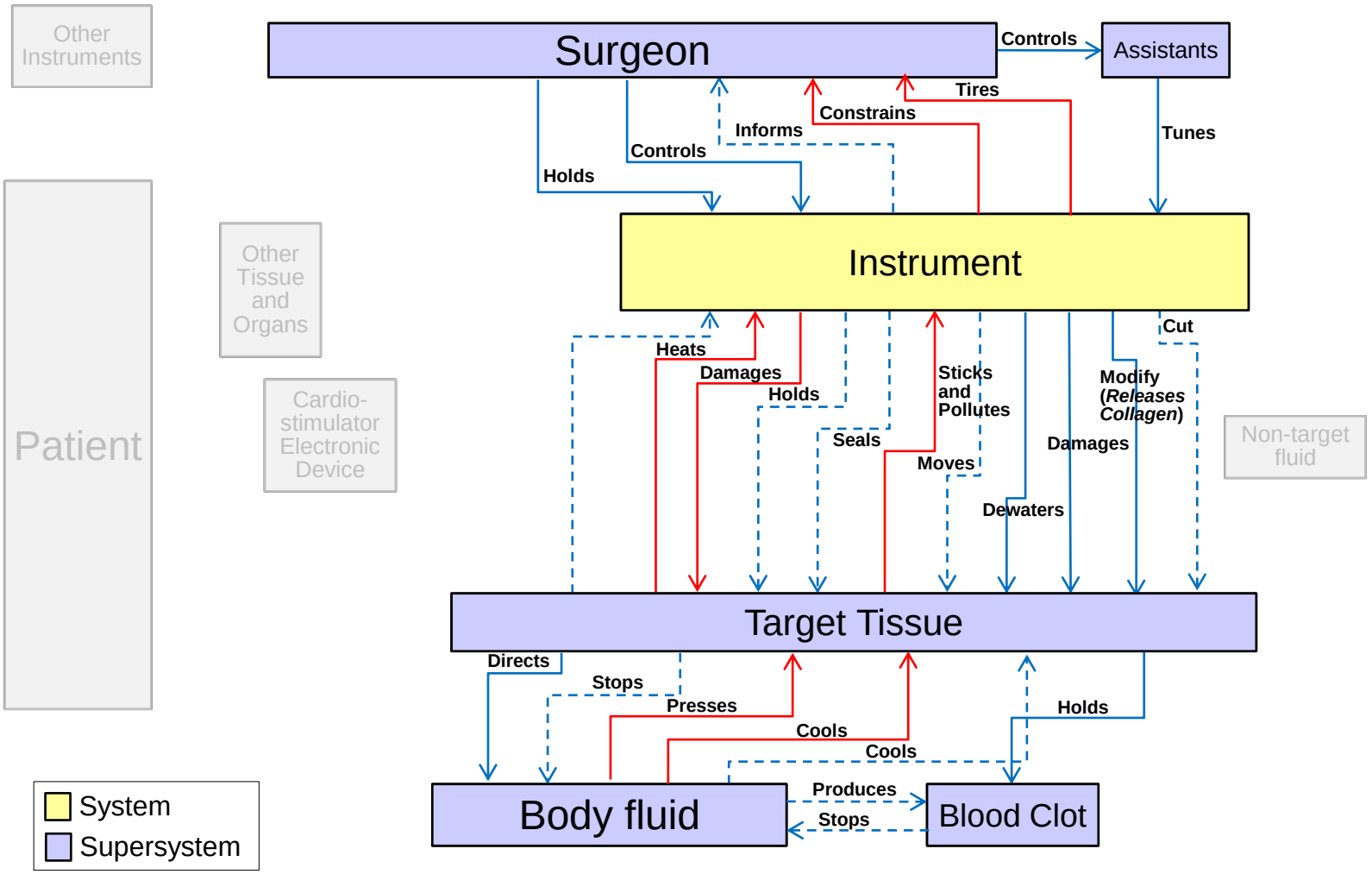
- Quality of procedure
- Speed
- Safety
- Thermal damage
- Ease of use/ergonomics

Right Target – *Finding new sources of customer value*

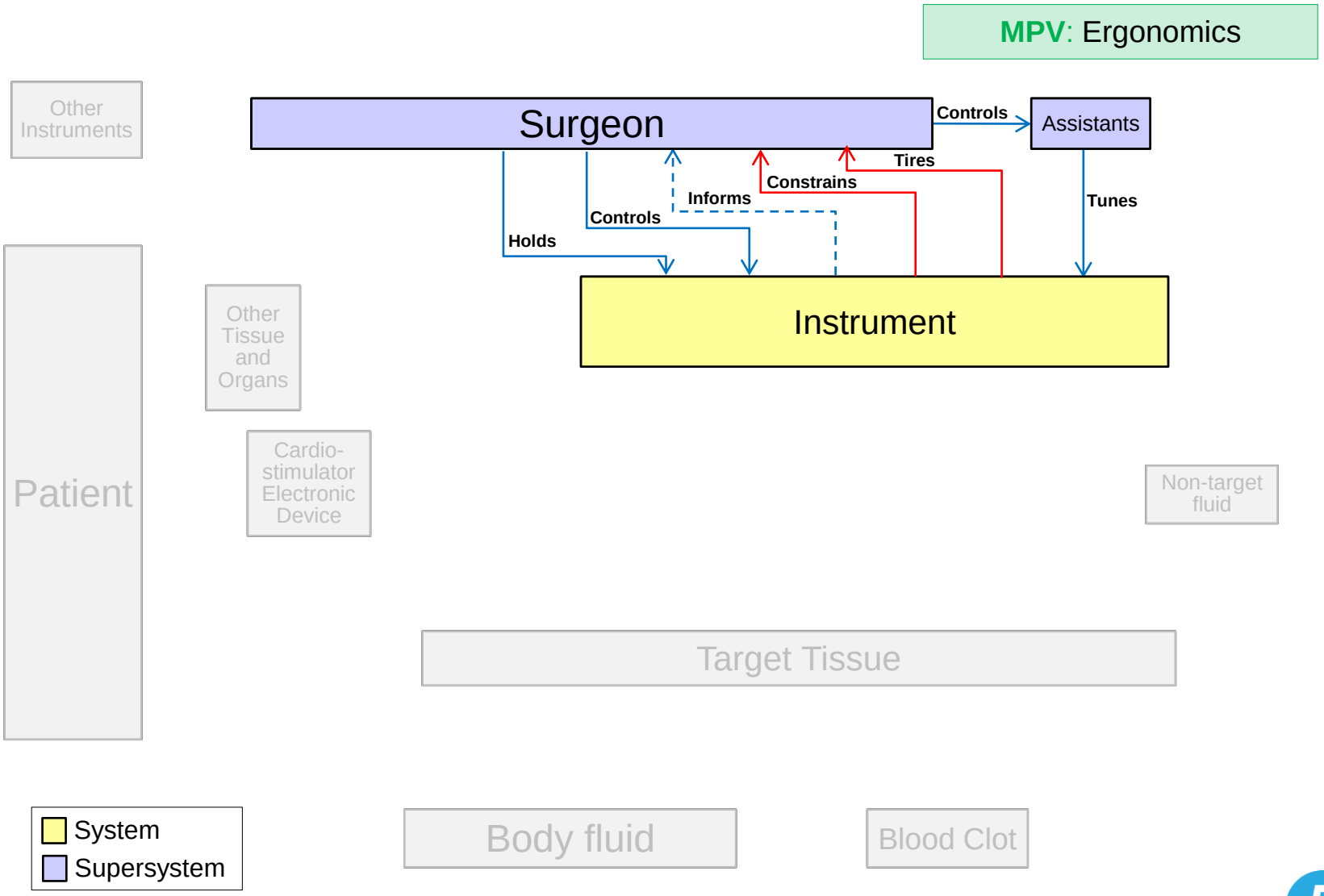


Right Target – *Finding new sources of customer value*

MPV: Quality of Procedure

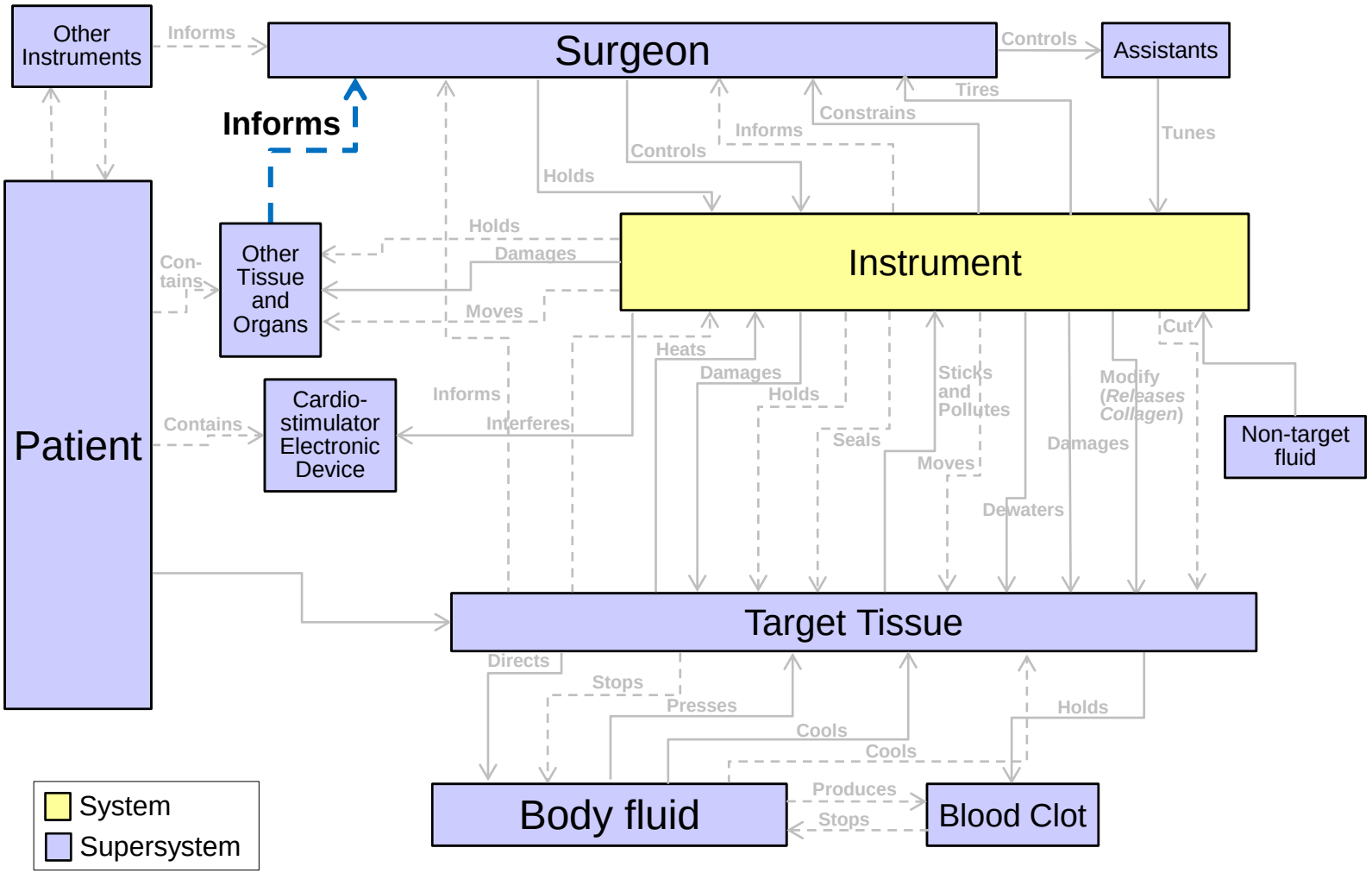


Right Target – *Finding new sources of customer value*



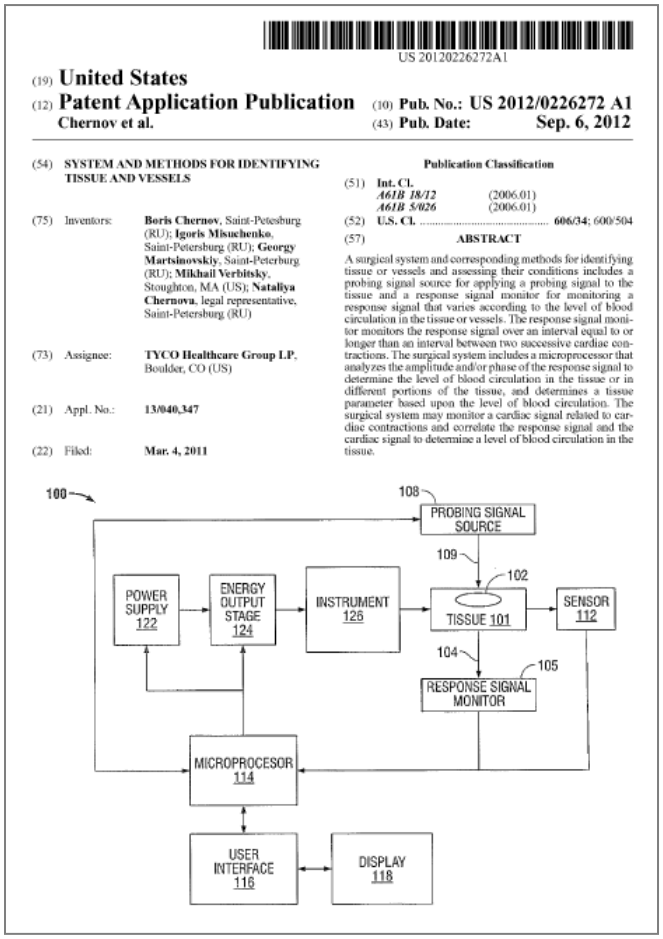
Right Target – *Finding new sources of customer value*

Latent MPV: Tissue Recognition?



Right Target – *Finding new sources of customer value*

Latent MPV: Tissue Recognition?



US 20120226272A1

(19) **United States**

(12) **Patent Application Publication**
Chernov et al.

(10) **Pub. No.: US 2012/0226272 A1**
(43) **Pub. Date: Sep. 6, 2012**

(54) **SYSTEM AND METHODS FOR IDENTIFYING TISSUE AND VESSELS**

(75) Inventors: **Boris Chernov**, Saint-Petesburg (RU); **Igoris Misuchenko**, Saint-Petersburg (RU); **Georgy Martsinovskiy**, Saint-Peterburg (RU); **Mikhail Verbitsky**, Stoughton, MA (US); **Nataliya Chernova**, legal representative, Saint-Petersburg (RU)

(73) Assignee: **TYCO Healthcare Group LP**, Boulder, CO (US)

(21) Appl. No.: **13/040,347**

(22) Filed: **Mar. 4, 2011**

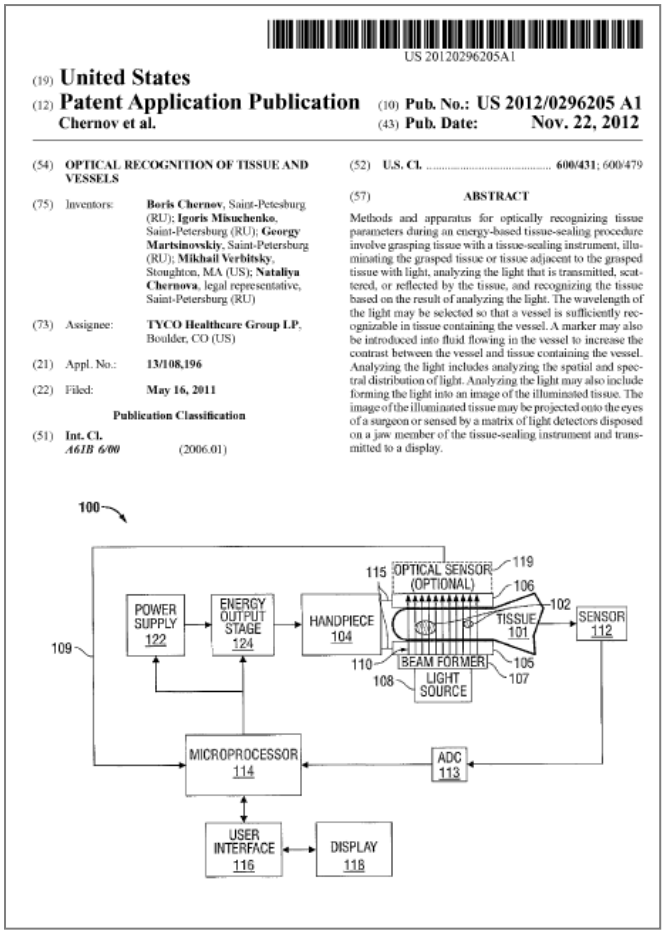
Publication Classification

(51) **Int. Cl.**
A61B 18/12 (2006.01)
A61B 5/026 (2006.01)

(52) **U.S. Cl.** **606/34**; 600/504

(57) **ABSTRACT**

A surgical system and corresponding methods for identifying tissue or vessels and assessing their conditions includes a probing signal source for applying a probing signal to the tissue and a response signal monitor for monitoring a response signal that varies according to the level of blood circulation in the tissue or vessels. The response signal monitor monitors the response signal over an interval equal to or longer than an interval between two successive cardiac contractions. The surgical system includes a microprocessor that analyzes the amplitude and/or phase of the response signal to determine the level of blood circulation in the tissue or in different portions of the tissue, and determines a tissue parameter based upon the level of blood circulation. The surgical system may monitor a cardiac signal related to cardiac contractions and correlate the response signal and the cardiac signal to determine a level of blood circulation in the tissue.



US 20120296205A1

(19) **United States**

(12) **Patent Application Publication**
Chernov et al.

(10) **Pub. No.: US 2012/0296205 A1**
(43) **Pub. Date: Nov. 22, 2012**

(54) **OPTICAL RECOGNITION OF TISSUE AND VESSELS**

(75) Inventors: **Boris Chernov**, Saint-Petesburg (RU); **Igoris Misuchenko**, Saint-Petersburg (RU); **Georgy Martsinovskiy**, Saint-Petersburg (RU); **Mikhail Verbitsky**, Stoughton, MA (US); **Nataliya Chernova**, legal representative, Saint-Petersburg (RU)

(73) Assignee: **TYCO Healthcare Group LP**, Boulder, CO (US)

(21) Appl. No.: **13/108,196**

(22) Filed: **May 16, 2011**

Publication Classification

(51) **Int. Cl.**
A61B 6/00 (2006.01)

(52) **U.S. Cl.** **600/431**; 600/479

(57) **ABSTRACT**

Methods and apparatus for optically recognizing tissue parameters during an energy-based tissue-sealing procedure involve grasping tissue with a tissue-sealing instrument, illuminating the grasped tissue or tissue adjacent to the grasped tissue with light, analyzing the light that is transmitted, scattered, or reflected by the tissue, and recognizing the tissue based on the result of analyzing the light. The wavelength of the light may be selected so that a vessel is sufficiently recognizable in tissue containing the vessel. A marker may also be introduced into fluid flowing in the vessel to increase the contrast between the vessel and tissue containing the vessel. Analyzing the light includes analyzing the spatial and spectral distribution of light. Analyzing the light may also include forming the light into an image of the illuminated tissue. The image of the illuminated tissue may be projected onto the eyes of a surgeon or sensed by a matrix of light detectors disposed on a jaw member of the tissue-sealing instrument and transmitted to a display.

Innovator's Manifesto

Right Target

"A lot of times, people don't know what they want until you show it to them." — Steve Jobs

"Every object tells a story…if you can read it." — Henry Ford

Right Altitude

"It's so much easier to suggest solutions when you don't know too much about the problem." — Malcomb Forbes

Right Problem

"If I had an hour to solve a problem I'd spend 55 minutes thinking about the problem and 5 minutes thinking about solutions."
— Albert Einstein

Right Solution

"There are not more than five musical notes, yet the combinations of these five give rise to more melodies than can ever be heard. There are not more than five primary colours, yet in combination they produce more hues than can ever been seen. There are not more than five cardinal tastes, yet combinations of them yield more flavours than can ever be tasted." — Sun Tzu, The Art of War

Innovator's Compass

Leverage **Focus**

Wayne Rooney – delivering Return to Investors