The Crowd as an Innovation Partner

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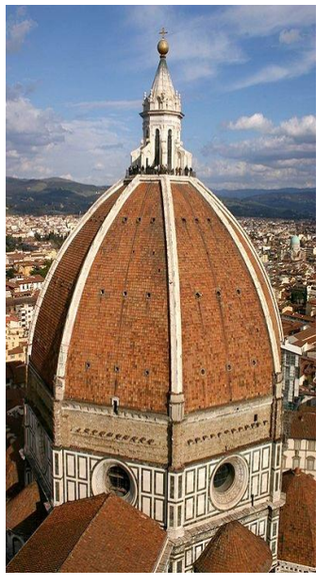
Harvard Business School | Harvard Institute for Quantitative Social Science
Crowd Innovation Lab | NASA Tournament Lab

[TopCoder]
A Place to COMPETE

My Research Executes Field Experiments in Innovation and Crowdsourcing

Crowds are an Historically Important ***Alternative*** Institution for Driving Innovation....



The Duomo - Florence
1418 - Up to 2,000 Florins

The Longitude Prize
1714 - Up to £20,000

Invention of Food Canning
1800 - Up to 12,000 Francs

....Currently Popular as Well.....

Ansari X-Prize – Space Travel
1996 – $10,000,000

Netflix Prize - Movie Rec.
2006 - 2009
Over 5000 Teams - $1M

Local Motors – Car Design
2008 – Over 35000 Submits

The Basic Underlying Belief

“No Matter Who You Are Most of the Smartest People Work for Someone Else”

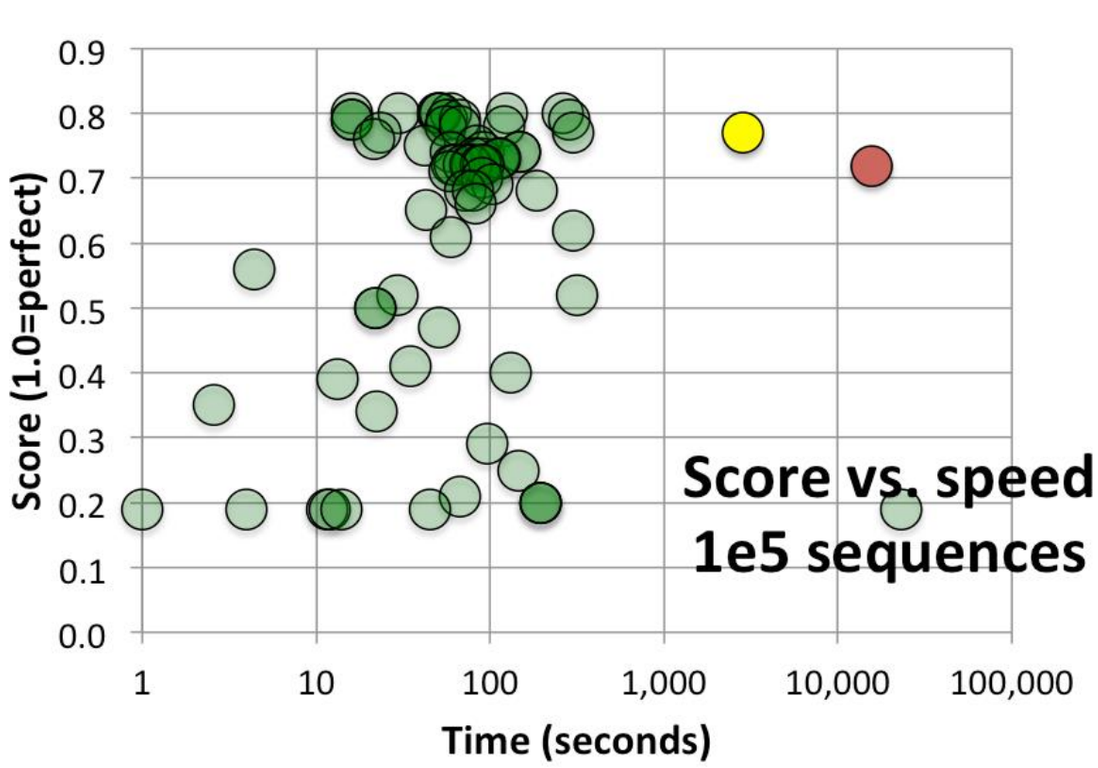
Bill Joy
(Sun Microsystems, BSD Unix, Java)

Are Crowds Smarter than Harvard Medical School?

- Objective: Improve on NIH MegaBlast algorithm for nucleotide sequence alignment for immunogenomics
- Experiment: Generate and evaluate external solver participation in development of gene-sequencing tools applied to immunoglobulin and antibody genomics
- Two week long competition - $2000 prize pot x 3 on TopCoder.com

Contest Results Shows the Discovery of Extreme Value Outcomes Relatively Quickly

- 122 coders submitted 654 submissions
- 34 coders exceeded state of the art by 10^2 - 10^5
- 89 different approaches to solve problem identified
- Winners from Russia, France, Egypt, Belgium & US
- Annotate 10 million sequences in < 3 mins; Quarter billion sequences in ~ 1 hour on laptop



Contest to Solve Highly Complex Analytics Problem

NASA
Tournament Lab

Broad Engagement

(459 Competitors & 2000 Code Submissions)

$10,000

carlop

Submission	4
Score	156,811.82

$5,000

zlfengyi1

Submission	9
Score	156,802.37

$3,000

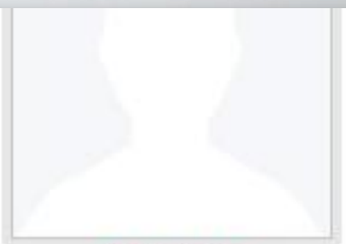
nhzp339

Submission	4
Score	156,741.03

$1,750

Psyho

Submission	4
Score	156,691.70



$1,500

zaq1xsw2tktk

Submission	14
Score	156,667.32

6

$1,250

7

$1,000

8

$750

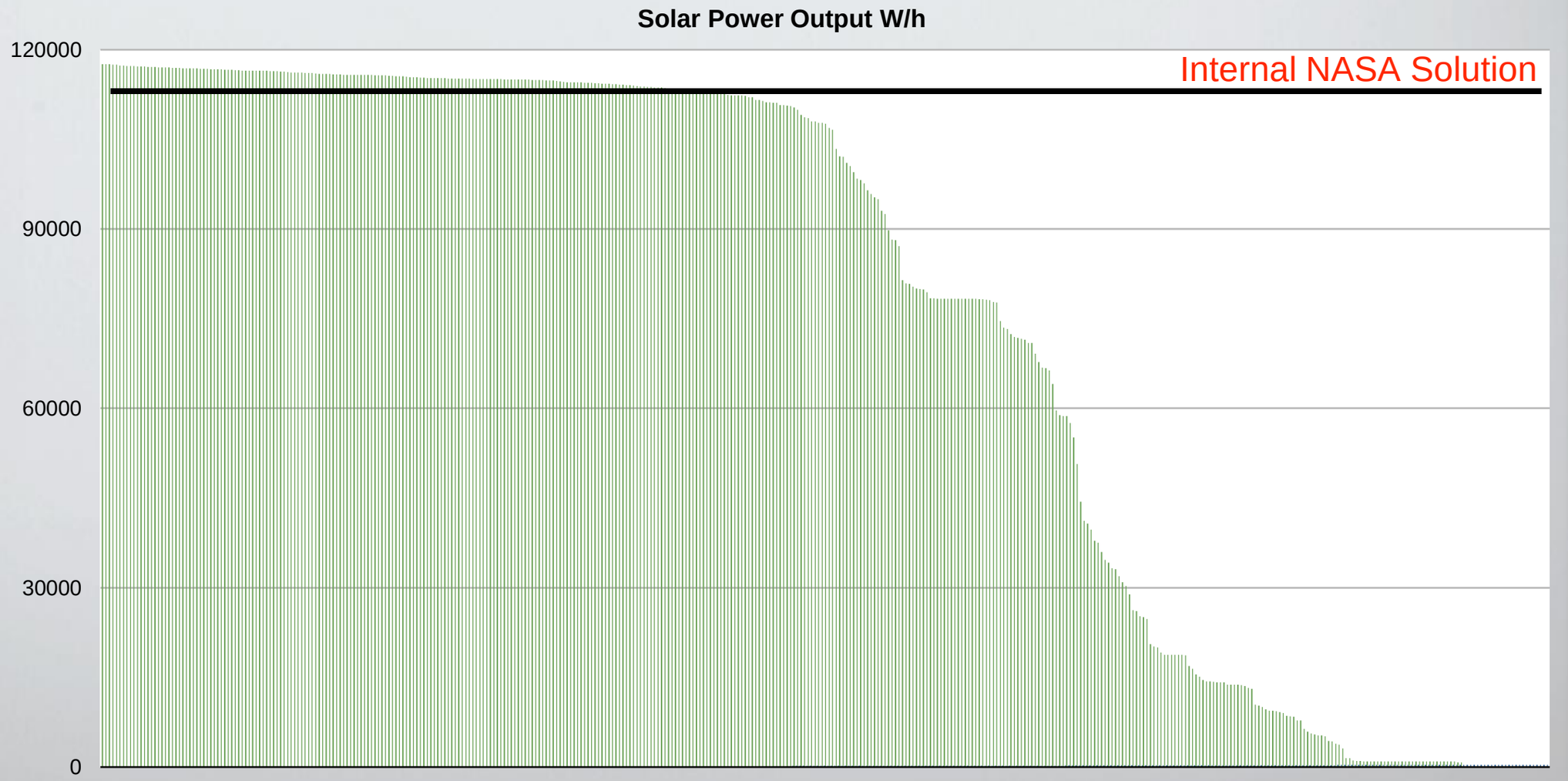
9

$500

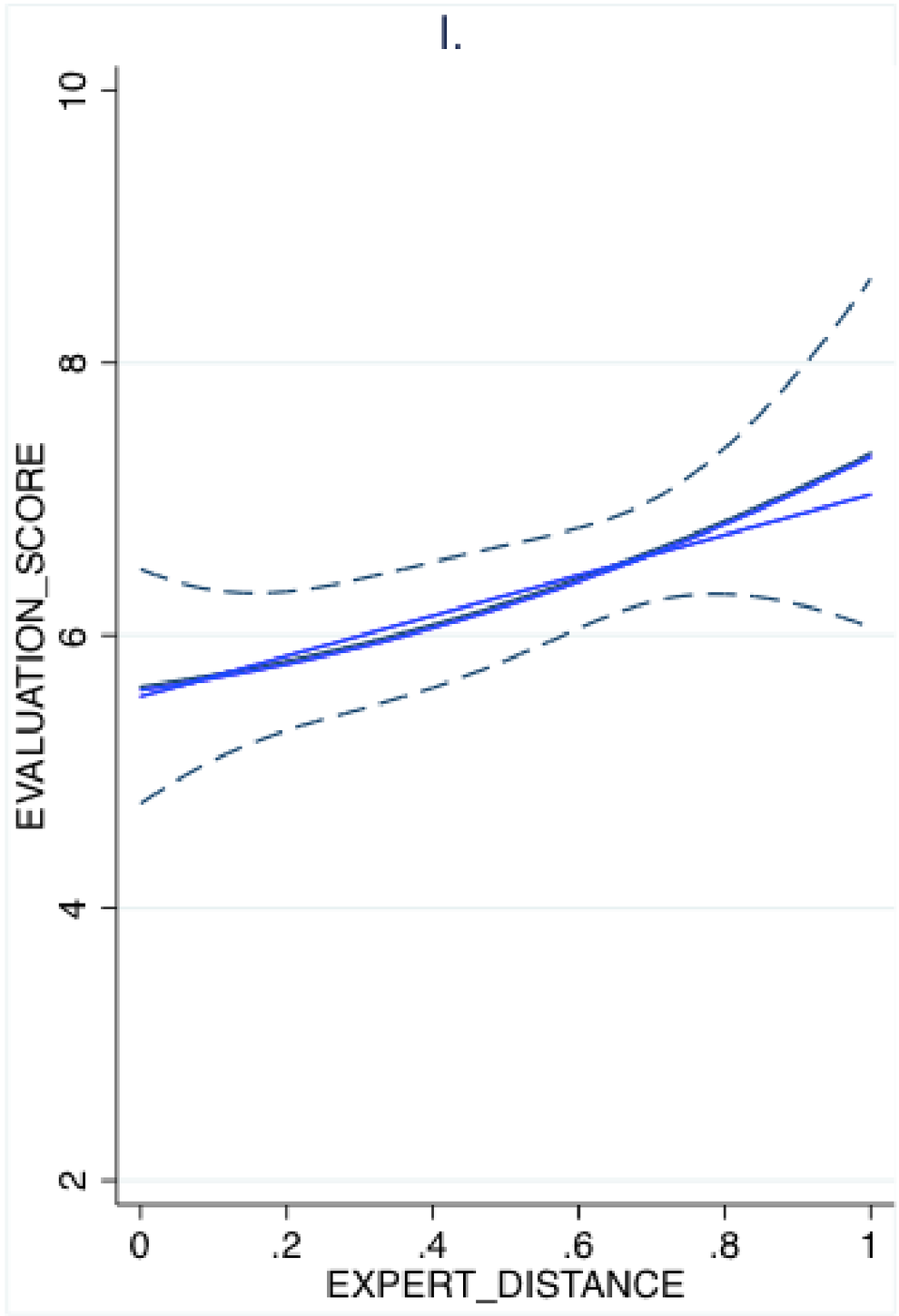
10

$250

Broad Engagement (459 Competitors & 2000 Code Submissions) & High Performance



The Challenge of Novel Evaluating Novel Ideas
(HMS Data- Randomized Experiment on Evaluation of Scientific Dat



“Crowds” Can Be Organized as Contests or Communities
(Boudreau & Lakhani 2013; King and Lakhani 2013)

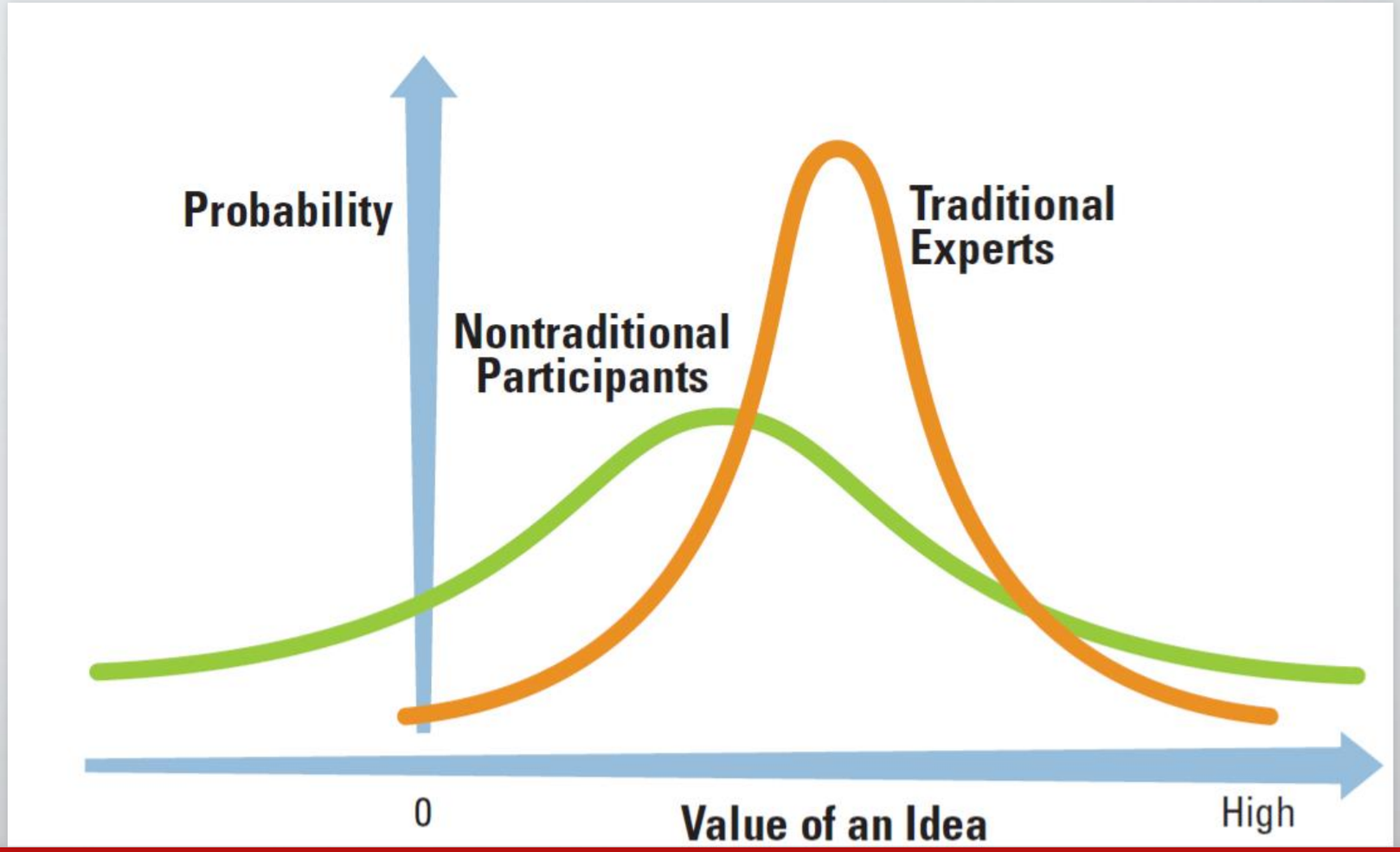
Contests/Competition

- Innovation problem requires diversity of approaches and broad experimentation
- Sponsor not sure what combination of skills and approaches might be useful in solution generation
- Clear rules for participation and winning

Communities/Collaboration

- Innovation problem requires cumulative knowledge building and aggregation of diverse inputs
- Contributions range from mix & match to co-production with modular tasks and functions
- Informal, norms-based governance

Crowds Enable Discovery of Extreme Values Through Lots of Entry and Diversity in Participation Pool



Diversity of Approaches in Solving the X-Prize Automotive Challenge

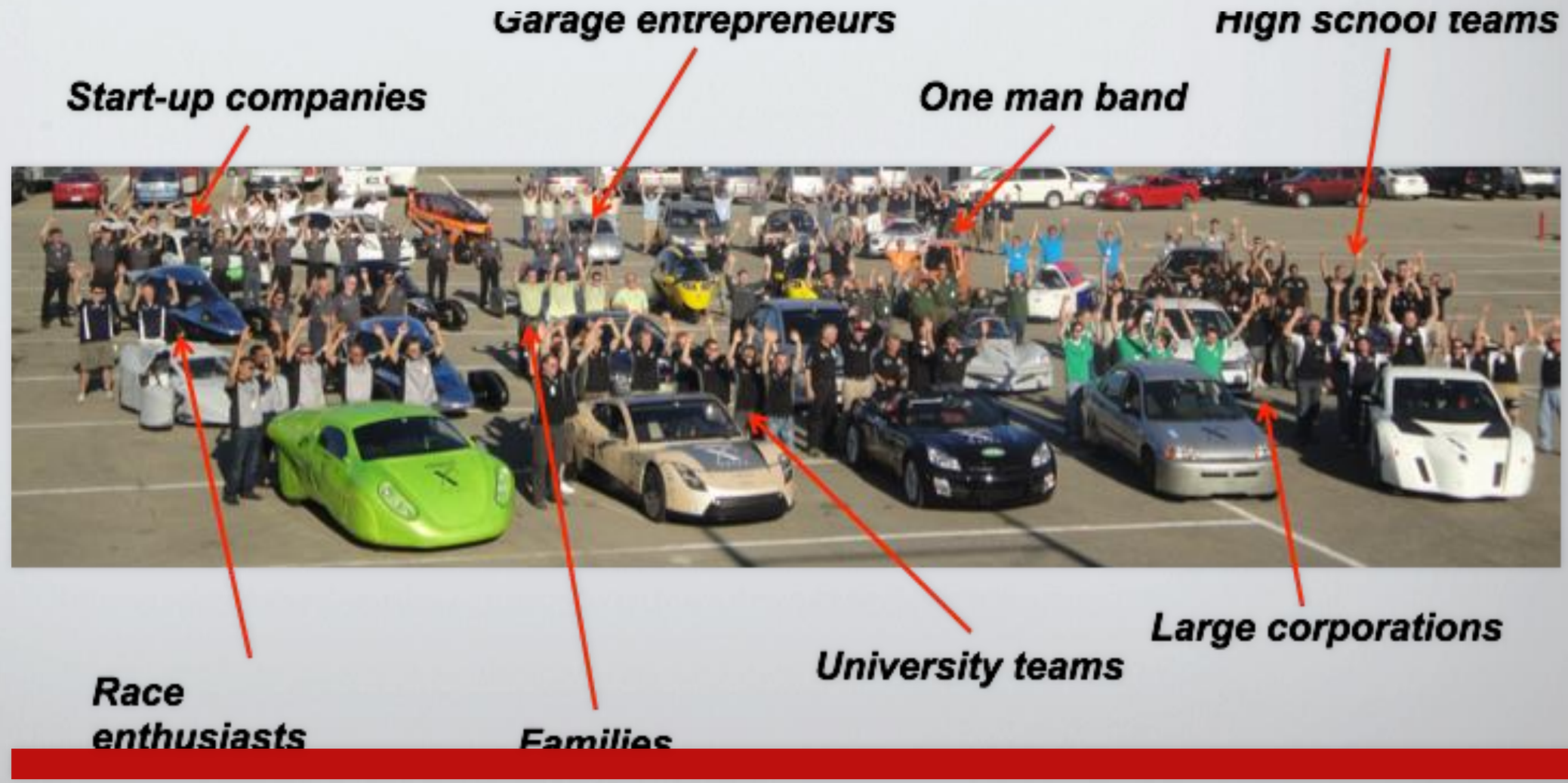
TW4XP Germany
1 wheel at front 2 wheels at back

KWAY MOTORS Italy
2 wheels at front 1 wheels at back

APTERA California
2 wheels at front 1 wheel at back

X-TRACER Switzerland
1 wheel at front 1 wheel at back

Diversity of Participants in X-Prize Automotive Challenge



What Motivates People to Participate in Crowd Work?

When Do Crowds Don’t Work?

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JOSHUA D. MARGOLIS

MARK WETZEL

Avi Kremer

"I remember when I first came to HBS. I felt like a diamond in the rough that only nee
to fulfill its destiny – conquer the business world . . . I thought that I had it all figured out.
total control of my life. But destiny had its own plan . . ."

— Avichai "Avi" Kremer in a message to his Harvard Business Schoo

Long before dawn on a spring morning in 2006, Avichai "Avi" Kremer faced
challenges of his everyday life: buttoning his shirt. His hands moved slowly as he
the button's eyehole. After 15 minutes, his final button caught its mark and Avi lim
room of his One Western Avenue apartment for breakfast. Frustrated as he was b
disobedient hands, Avi cracked a smile as he turned on his computer. On most
good to be alive.

Avi Kremer was diagnosed with Amyotrophic Lateral Sclerosis ("ALS,"
Disease") at age 29, just months into his first semester at Harvard Business Schoo

Avi Kremer '06 & Section Mates Establish Prize4Life First Prize-Based Medical Research Foundation for ALS

HARVARD | BUSINESS

KARIM R. LAKHANI
ANNE-LAURE FAYARD
NATALIA LEVINA
STEPHANIE HEALY POKRYWA

OpenIDEO

Tim Brown, CEO and President of the award-winning global design firm wondered, "what would happen if instead of 500 employees, IDEO was 50,000 an impact would we have on the world if we scaled the spirit, process, and t innovation by a factor of 100?" Of course, he had no intention of hiring an add but he recognized that the answer to this question may lie in the future direct online "open innovation" platform that invited anyone in the world to important social issues using IDEO's unique approach to problem solving. It wa he supported the efforts of Tom Hulme, who had approached him with a see would ultimately become OpenIDEO. In less than two years since its official la team, led by Hulme, had enabled a community of almost 28,000 members from create solutions to twelve social challenges (**Exhibit 1**).

Tom Hulme ’07 Establishes OpenIDEO to Drive Social Innovation Challenges with Community (>90,000 Members)

HARVARD | BUSINESS | SCHOOL

9-510-062

REV: SEPTEMBER 12, 2011

MICHAEL NORTON

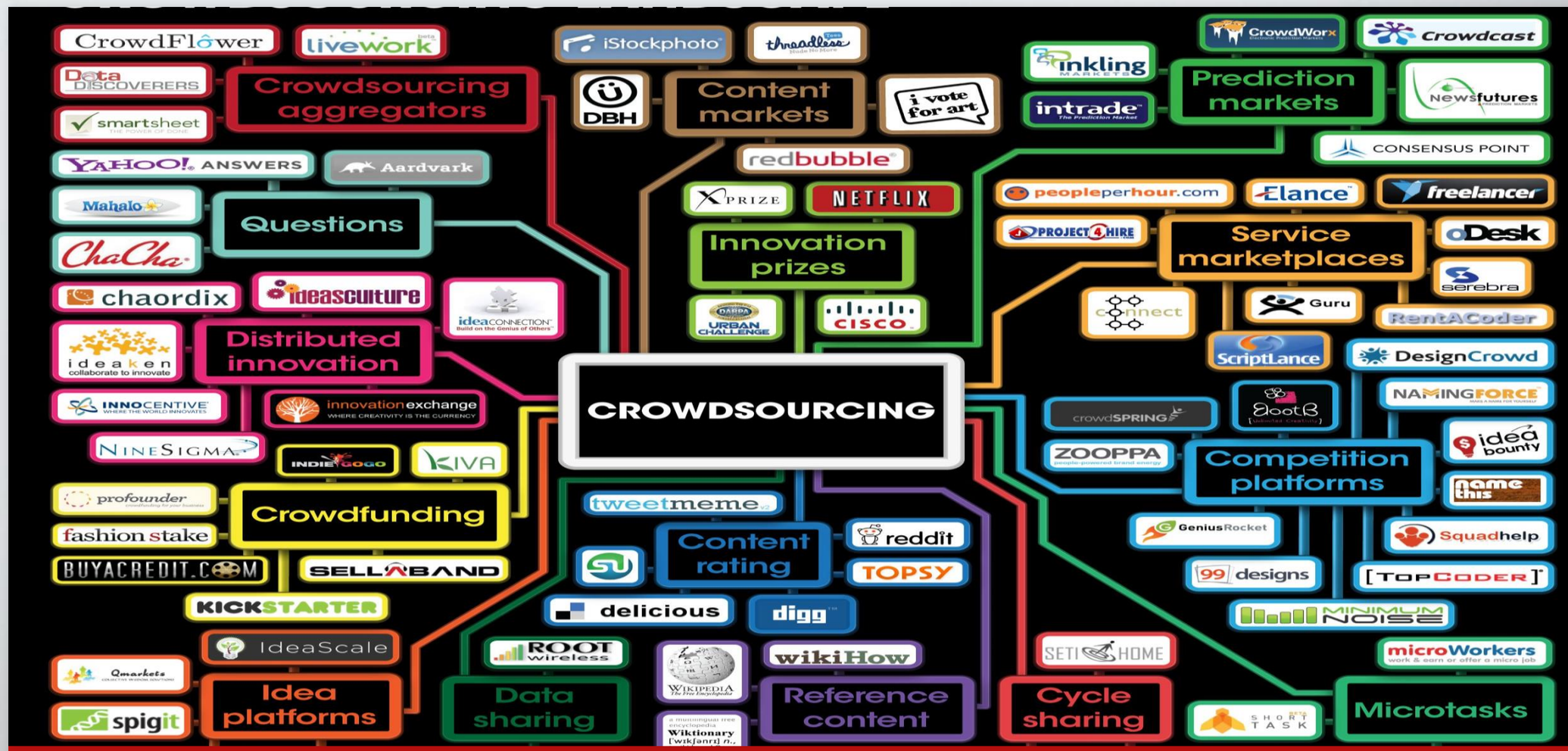
JEREMY DANN

Local Motors: Designed by the Crowd, Built by the Customer

Jay Rogers scurried through the hallway at Local Motors' (LM) Wareham, Massachusetts corporate headquarters as he coordinated with employees about the day's hectic schedule of events. Fortunately, the hallway was only about 15 feet long and included just three offices. LM's 3,000-square-foot office and garage space seemed a humble place from which major innovations impacting the automotive sector—one of the world's largest industries—might emerge.

Jay Rogers '07 - Establishes Local Motors to Crowdsource Automobiles

Crowds Are Now Available on Demand



Thanks!

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