Measuring Free Household Sector Innovation

(Book*: Free Innovation* MIT Press (2016), forthcoming)

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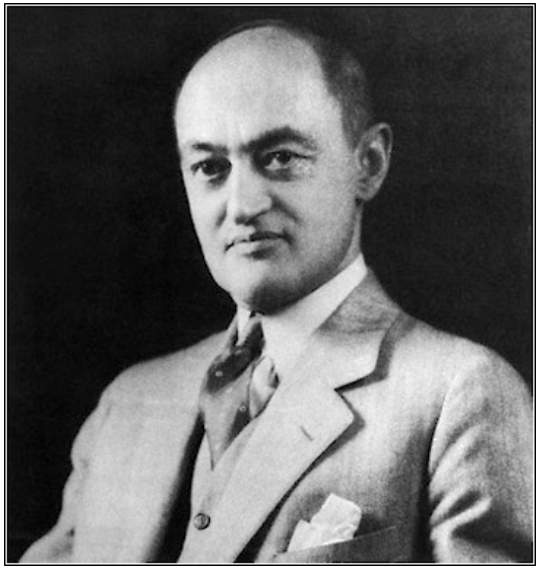
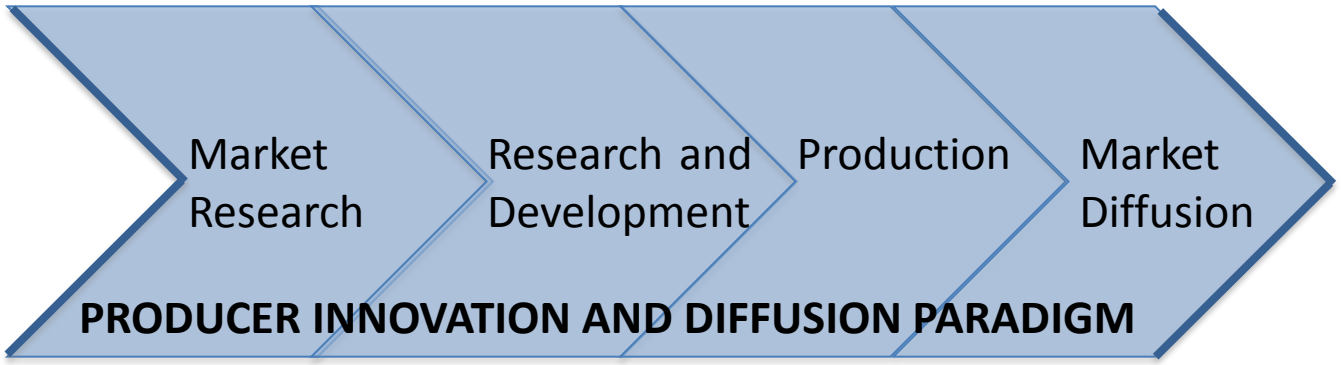
Talk summary

1. Importance of Household sector innovation is “Huuuuge!”
2. Household sector innovation is today not being measured at all – is today not even defined as innovation because diffused for free.
3. Not measuring household sector innovation is creating distortions in what governments DO measure – and distorting the basis for important public policy choices as well.
4. We need to measure household sector innovation!!

In economics, household sector consumers are traditionally viewed as passive users of producer-developed products and services – not as developers themselves

"It is … the producer who as a rule initiates economic change, and consumers are educated by him if necessary" (Schumpeter 1934, p. 65).





But findings from nationally-representative surveys (7 countries to date) beg to differ. The scale of product development in the household sector – is in fact huuuuge.

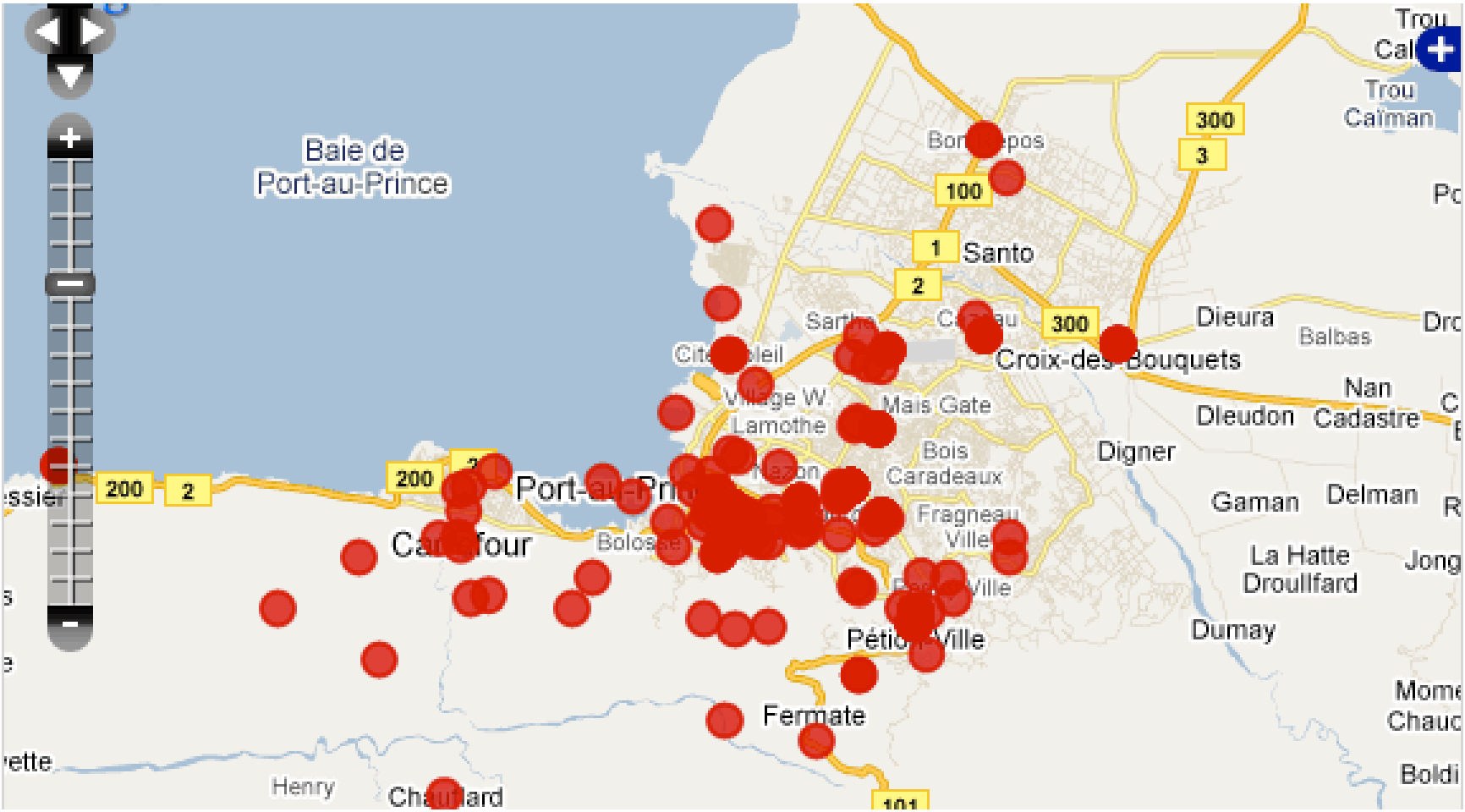
National surveys	U.K.	U.S.	Japan
% population innovating	6.1% (2.9 mil people)	5.2% (11.7 mil people)	3.7% (3.9 mil people)
Total Consumer spending on R&D	$5.2 billion	$20.2 billion	$5.8 billion
Consumer spending as % of R&D spending by firms on consumer products	140%	33%	13%

Von Hippel, de Jong and Flowers 2011, Ogawa and Pongtagalert 2013

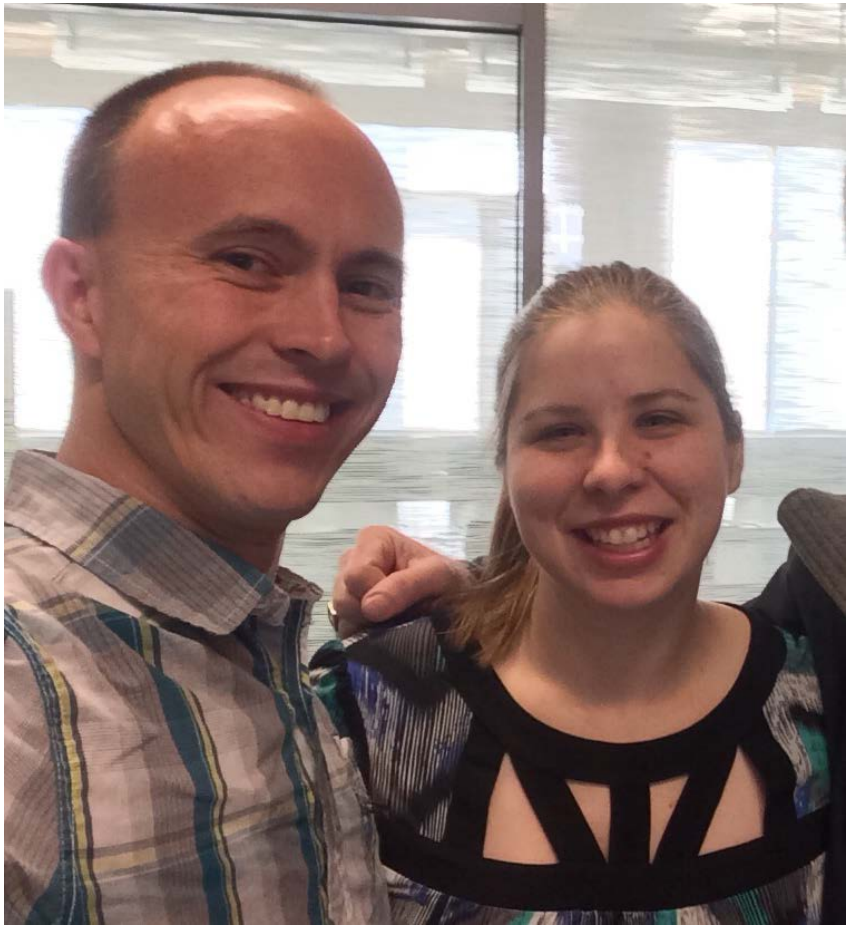
Individual consumers invent lots of things for their own use Suitcase with electric motor – invented by a Chinese farmer - to take him to and within the airport

Ushahidi is a free services example – a very valuable free disaster information system developed in the household sector

Haiti Crisis Map example



Medical example – patients develop artificial pancreas ahead of medical producers – and diffuse their design for free



Dana Lewis who has type 1 diabetes, and her fiancé, Scott Leibrand

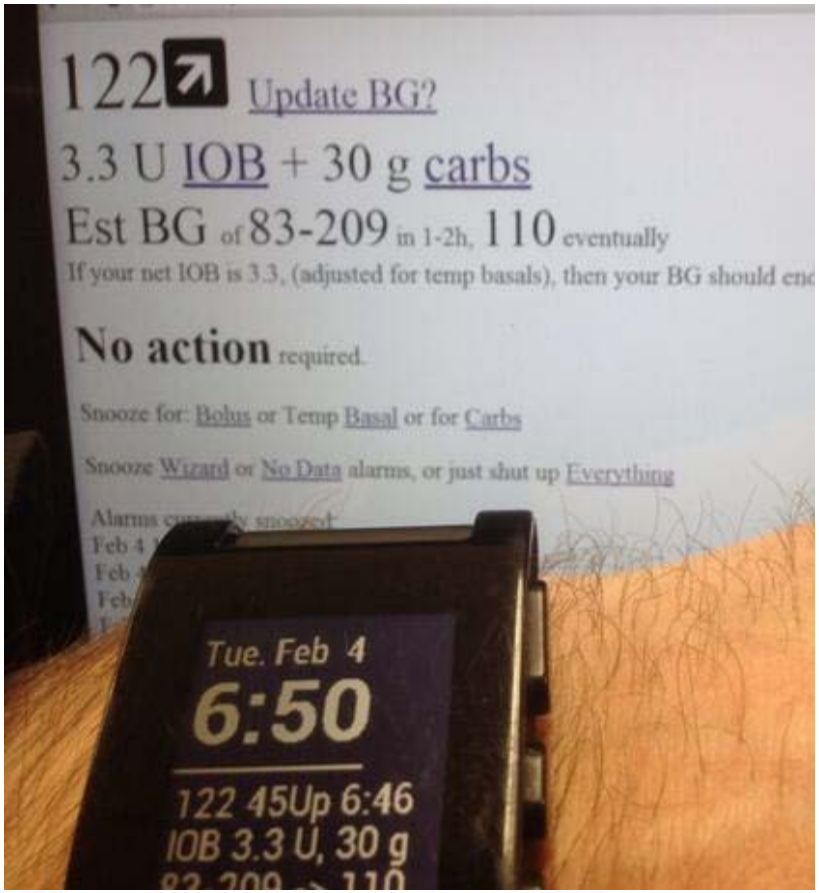
- People with diabetes make 300+ decisions a day that influence their blood glucose.
- Sample calculation at mealtime:

  Carbs (19 carbs*1:10)
  + correction for high blood glucose
  + % for insulin resistance
  – activity walking here
  + sitting still for next 3 hours
  – current insulin on board
  = how much insulin needed?

  Precision of manual calculations is poor

- Producers said "wait 5 years" Dana said, "I want an artificial pancreas ***now***

First, Dana and Scott made predictive software that provides real-time treatment recommendations.
Then, they built a closed loop artificial pancreas to automatically adjust insulin levels on Dana's insulin pump.
Other "NightScout" Community members helped



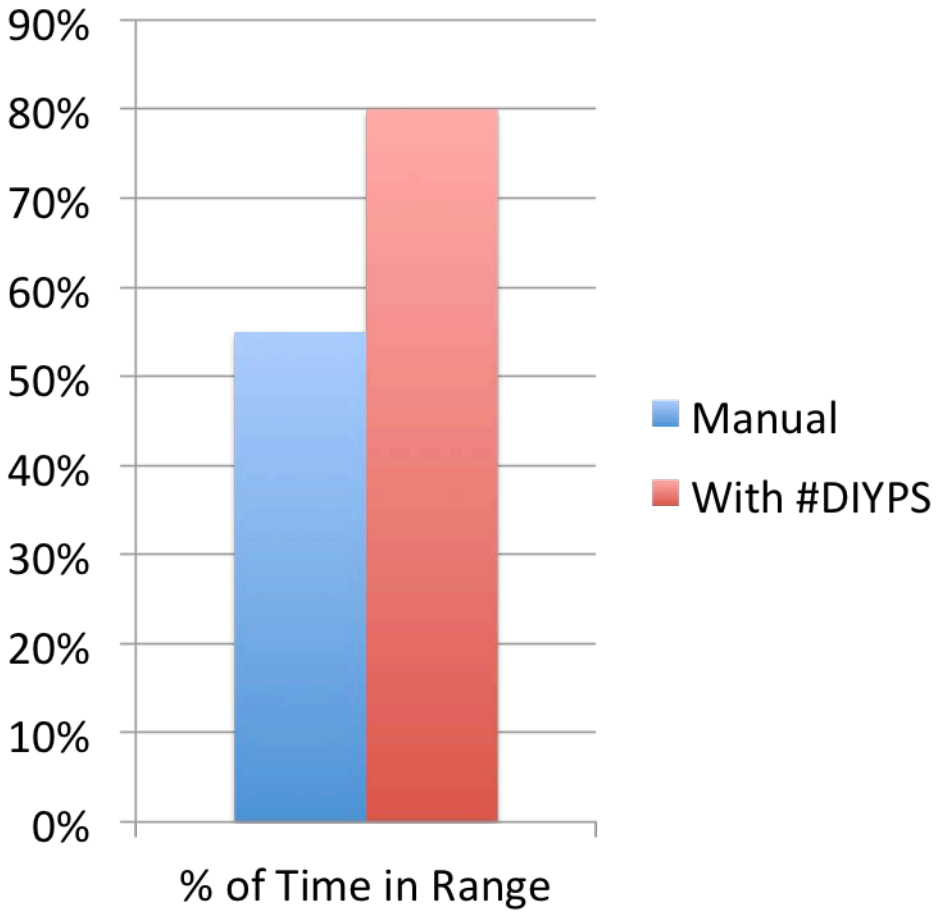
www.DIYPS.org

www.openAPS.org

Dana's artificial pancreas achieves within-range blood glucose outcomes better than her manual calculations did.

She uses it every day and night – and distributes the design free on the Web to others. Producers will follow after FDA approvals.

(Normal glucose range = 80-120 units)



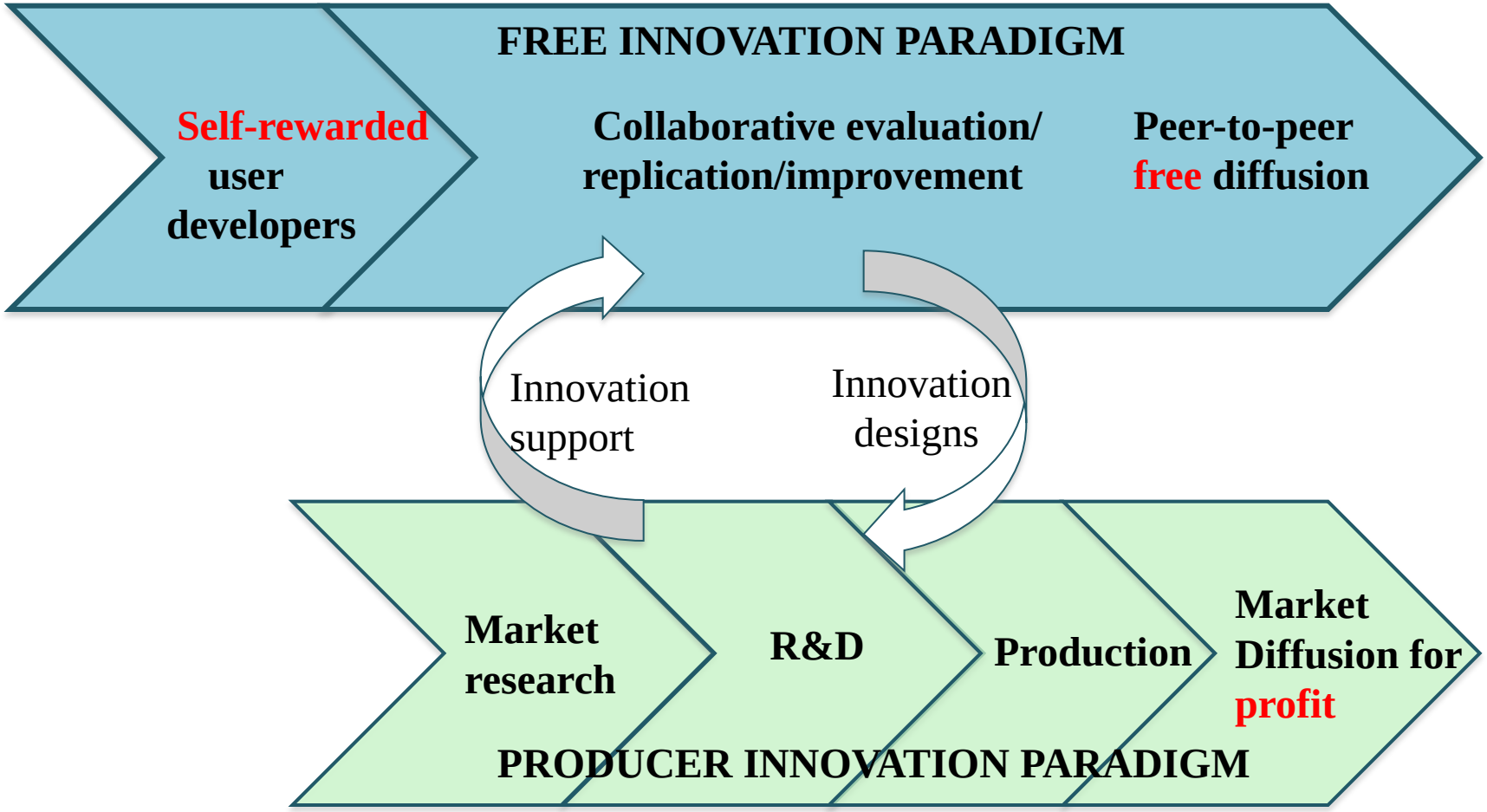
#DIYPS @DanaMLewis

90% of household sector innovation is “free innovation”:

Definition of free innovations:

(1)Innovations are developed at private cost by individuals during their unpaid leisure time – no one pays them to do it.

(2) Design information is unprotected by the developer – potentially acquirable by anyone “for free.”



Scale of household sector product development by citizens is huge – and seldom protected by IP

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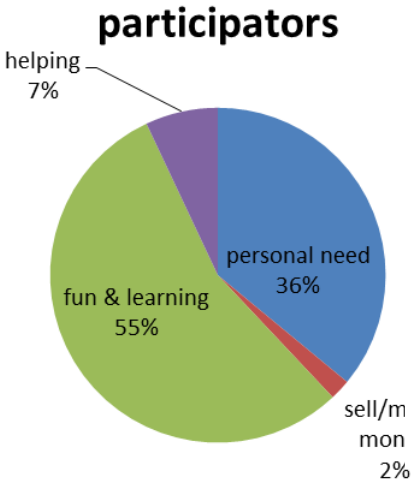
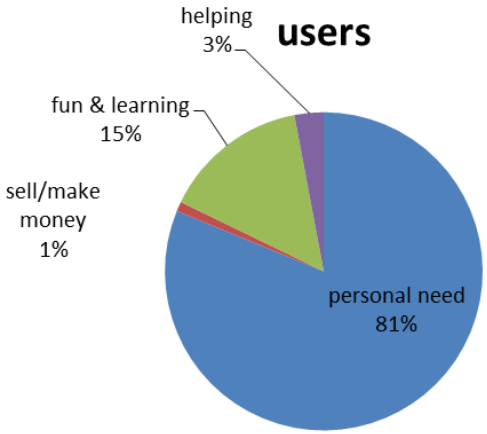
Total spending	$5.2 billion	$20.2 billion	$5.8 billion
% of R&D spending by firms on consumer products	140%	33%	13%
% with IPRs	**2%**	**9%**	**0%**

Household sector innovators can be clustered based upon the dominant **self-rewards** they seek

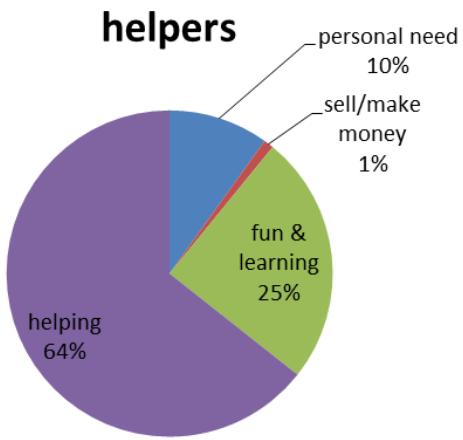
(Cluster Analysis: Data from survey of 408 innovating citizens in Finland, aged 18-65)



43%



37%



11%

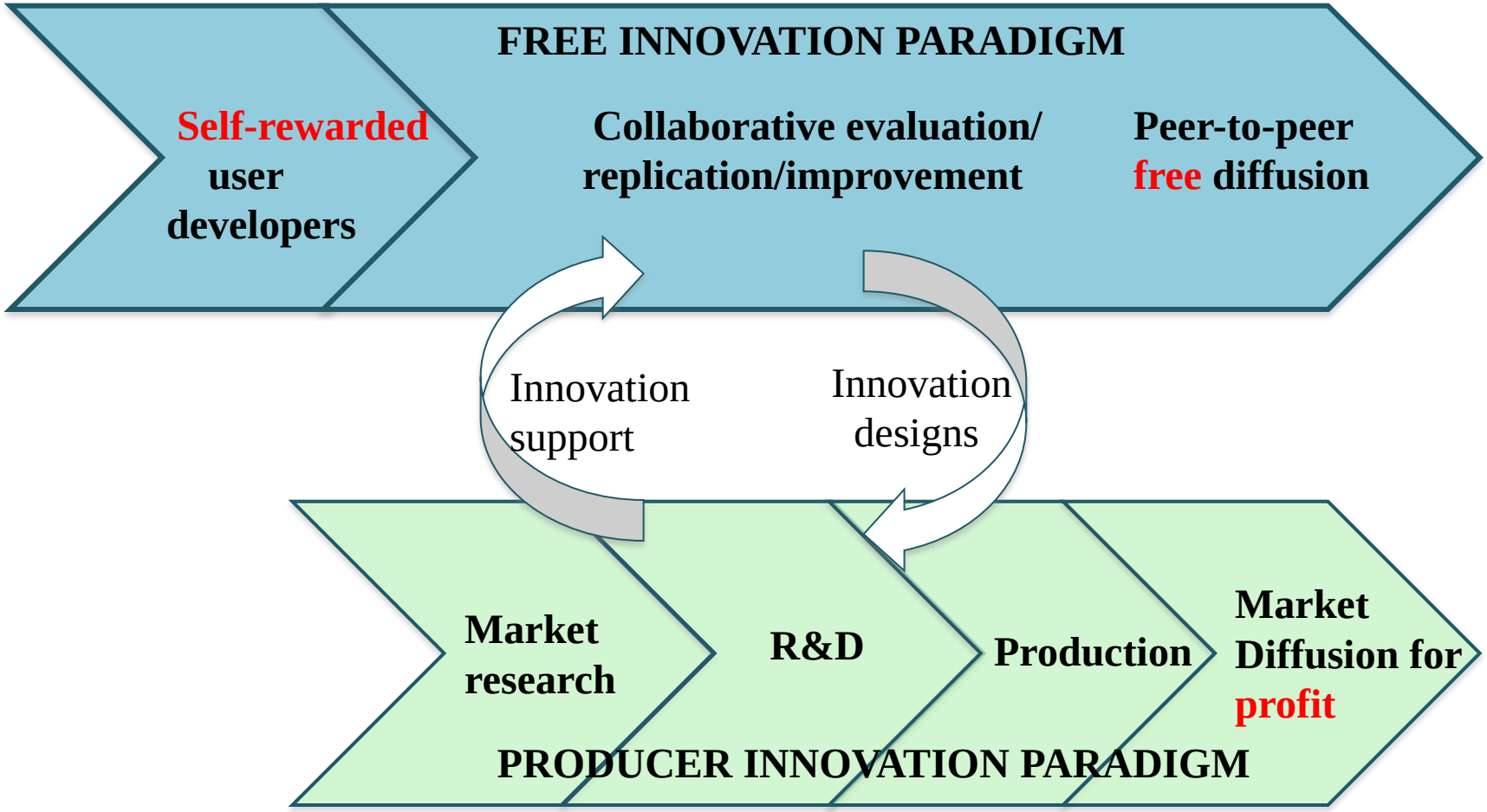
9%

Free innovation is today *not measured at all* officially

- WHY? Free innovation does not fit the Oslo (2005) definition of an innovation
- Within the OECD, the definition for an innovation includable in government statistics requires that it be introduced onto the market: “A common feature of an innovation is that it must have been *implemented*. A new or improved product is implemented when it is introduced on the market” (*Oslo Manual* 2005, paragraph 150).
- The consequence is that a free innovation – even one diffused millions of times for free over the Internet – becomes an innovation only when introduced to the market – *and is then credited to the producer that commercialized it!!*
- Huuuge consequences:
- Inflates our estimates of the effectiveness of producer R&D
- Inflates the apparent importance of IP

Many distortions with policy implications result from not measuring free innovation

- Free Innovation increases social welfare
- Producer innovation is overstated
- Free innovators are innovation pioneers
- There is an diffusion 'market failure' associated with free innovation



How to measure free innovation

Social surveys will be needed in addition to business surveys like CIS.

Test questions in CIS in Finland and Switzerland do show the phenomenon is of high or medium significance in the view of ~ 30% of producers.

Table 1: The importance to firms of products modified by users and developed by users, share of firms with innovation activity

Importance to firm:	High	Medium	Low	Not used
	Per cent			
All NACE*				
Modified by users	8.0	21.7	17.2	53.1
Developed by users	3.8	9.1	16.6	70.5
Goods producing**				
Modified by users	8.9	25.0	15.0	51.1
Developed by users	4.9	10.3	17.7	67.1
Services				
Modified by users	7.1	18.3	19.5	55.1
Developed by users	2.7	7.8	15.6	73.9

* Statistical classification of economic activities in the European Community

**Goods producing includes manufacturing, mining and quarrying, electricity, gas and air conditioning supply, water supply and waste management

Source: Statistics Finland (2012: Appendix Table 46)