

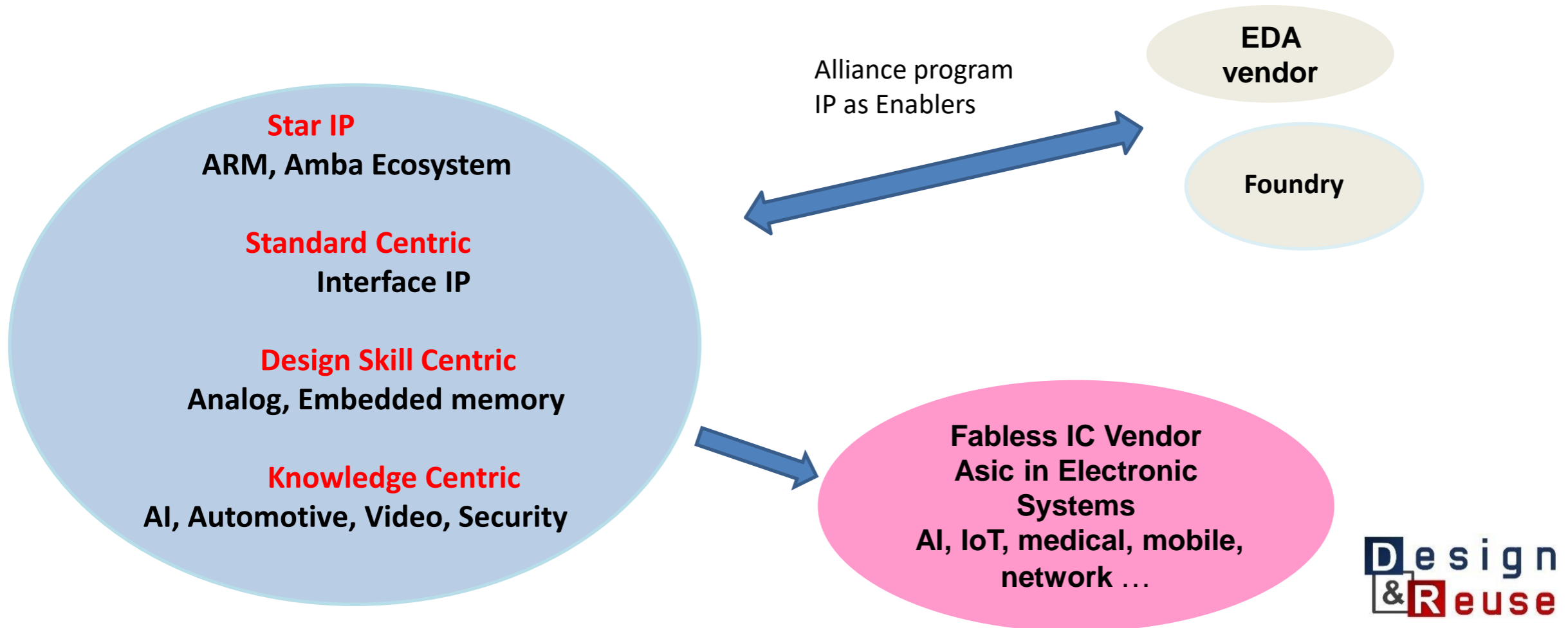
IP Provider the Seed of Innovation in Electronic Industry. Can IP Innovation be Measured?

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Design And Reuse

IP SoC Day Silicon Valley 2020

IP Concept: Why? Who? Which IP ?

- Why?
 - Time to market pressure; Engineering (Knowledge) shortage
 - Talented engineering available? Globalization?
- IP Concept born: Resource & Knowledge sharing/Reuse
- IP Business. NRE, Licensing fee, Maintenance, Royalty



Outline

- Introduction: D&R community
- D&R partners hold patents ? –Who and How many?
- Any correlation between IP attraction and patent holding?
- D&R initiative a patent panel

D&R Ecosystem: 42.000 Registered members

D&R founded in 97 as a privately hold company:

**Be the catalyst of IP Dissemination & IP business providing support to IP providers & IP consumers:
IP Search or scouting....**

- **Hold Premier IP SoC Market Place** www.design-reuse.com
 - displaying exhaustive list of resources available as Silicon IP and SoC (System on Chip) solutions
 - Facilitating the contact between provider and consumer
- Extended to www.dr-embedded.com (2012)
 - Dedicated to Application specific solutions (Automotive, AI, IoT, Security, ...)
- Extended to www.design-reuse-china.com (2016)
 - Dedicated to Chinese audience

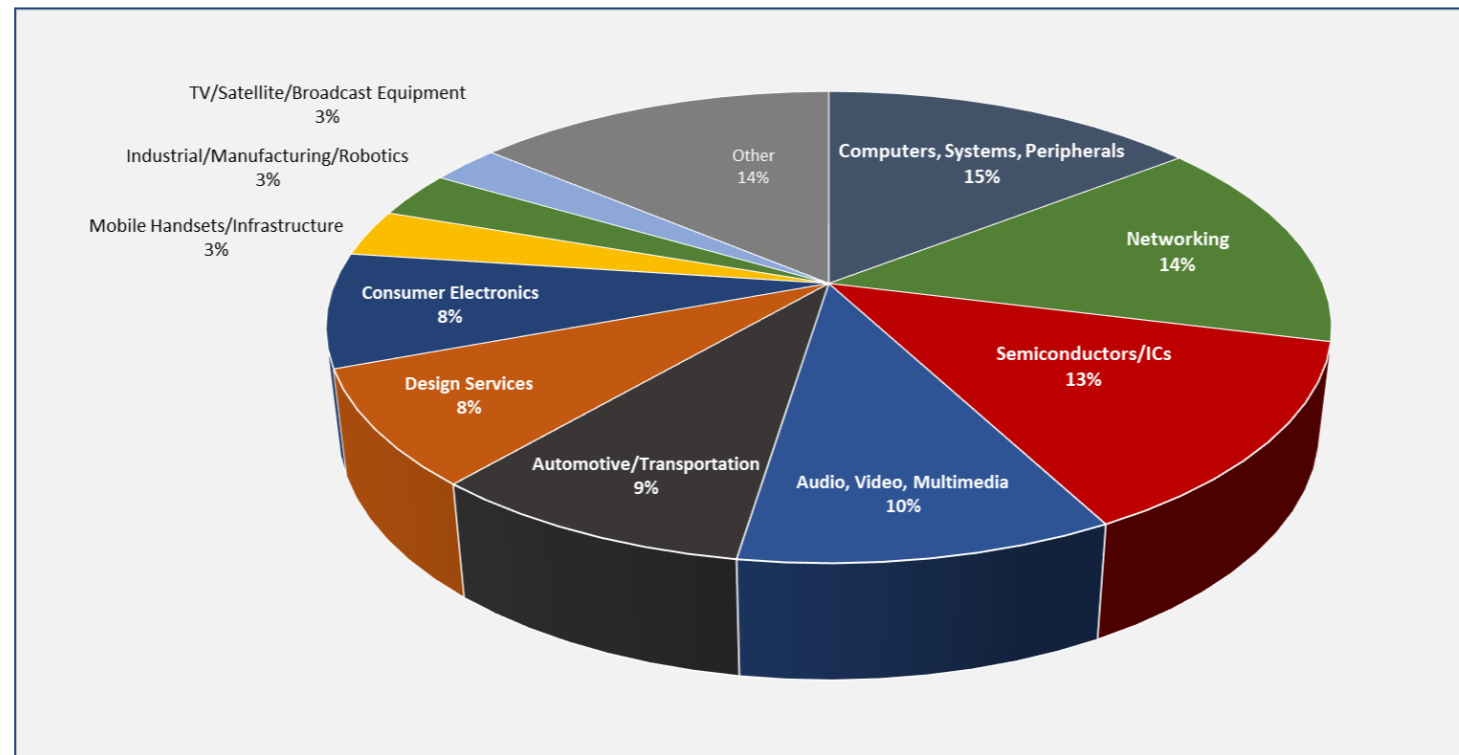
Provides next generation Technology and Services based on IP Management Platform - IPMS™

- Web e-Catalog
- IP Management Enterprise Platform For IP providers and IP consumers
- Vendor tool Management

D&R Community

- 42 000 Registered Users

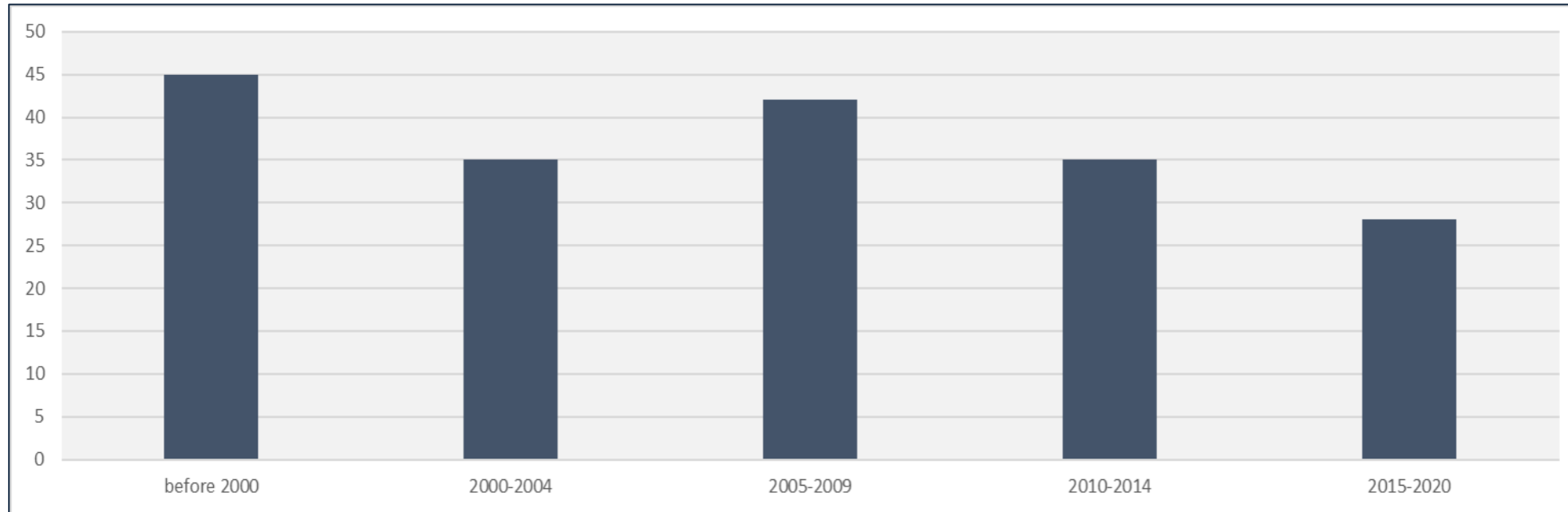
– End product



D&R Partners-185 Loyal IP Provider Partners

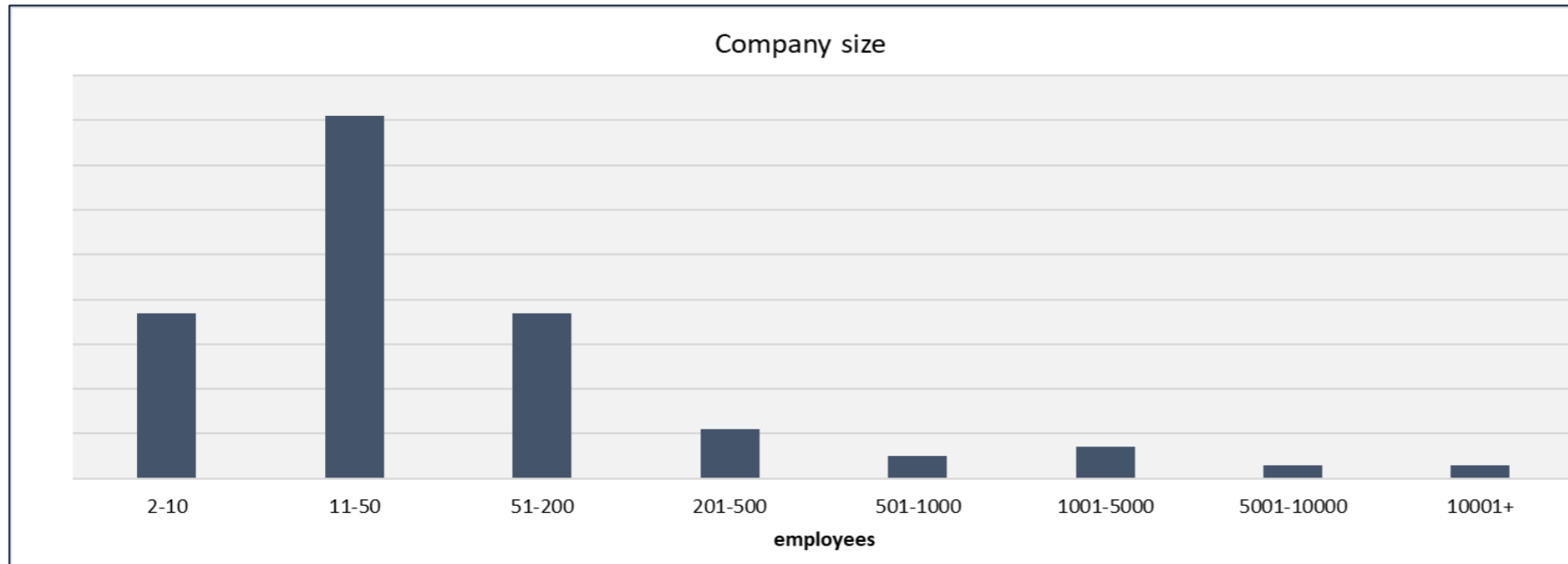
When was the company created ?

- Early at the IP concept launching (before 2000)
- A peak between 2000 and 2009 :the IP concept was mature
- Innovation does not stop...



D&R Partner Company Size

- Whole Spectrum of design forces in Electronic industry represented
 - Small innovators /design centres
 - 44% of Partners are medium sized design centres (11-50 employees)
 - Large and extra large companies participate (IP as enablers)



The number of IP providers who are partners of D&R is “stable”

The number of acquired companies compensate by the number of newly created companies

Provider as innovation seed of Electronic Industry ?

Are patent a proof of innovation?

- Who holds patent?
 - Those who can afford? Time and money?
 - Venture support
 - Proof of innovation needed
- Do patent holders attract more traffic on our website

Analysis targeting the IP providers partner of D&R

Important Note

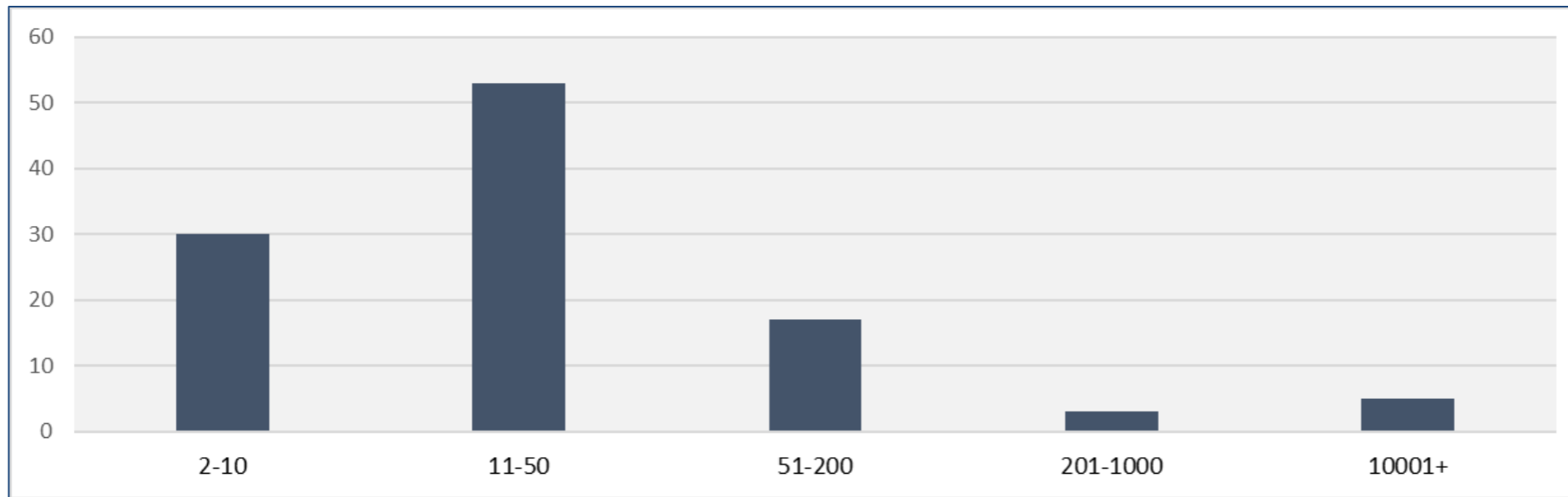
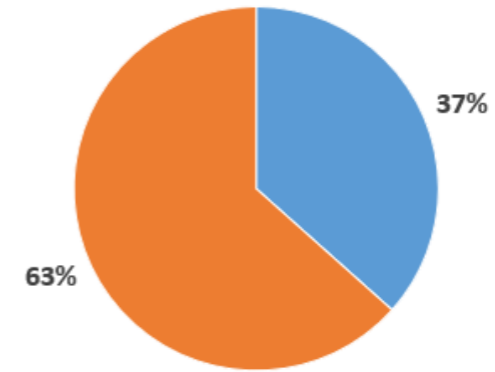
D&R performed a manual Google search for finding patents hold by our partners

No guarantee of completeness

Providers to contact us for correction

Who holds patents?

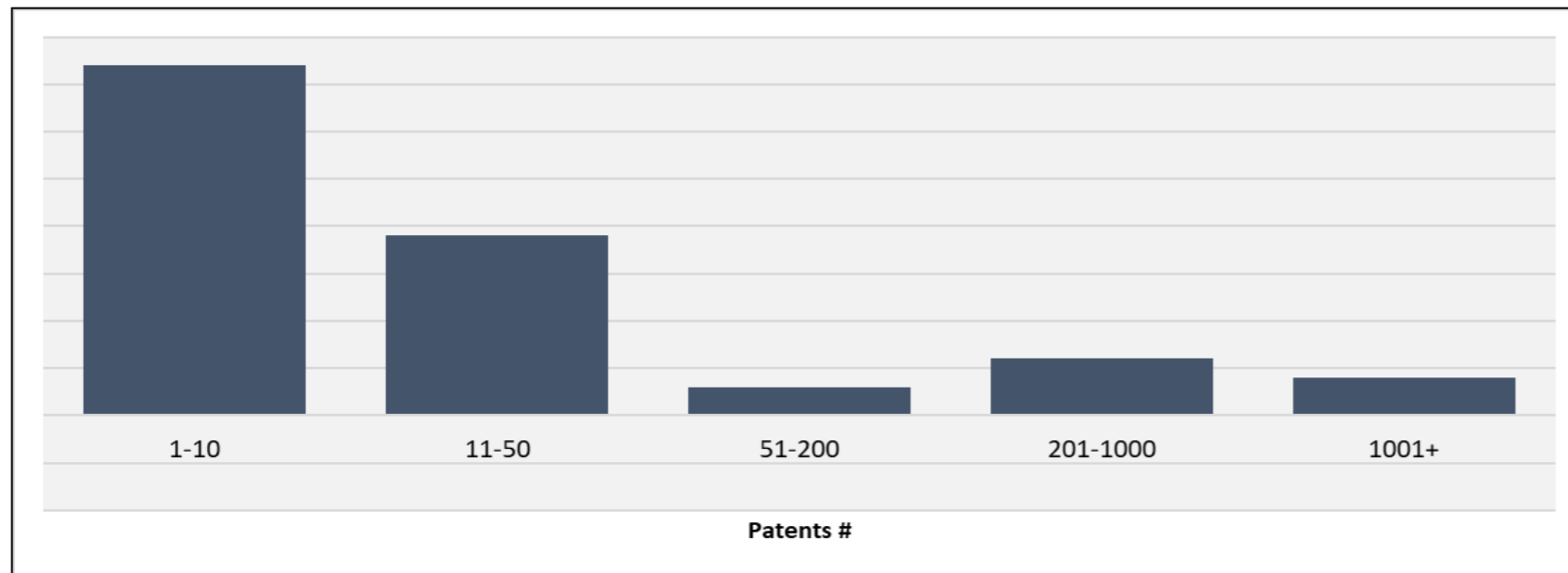
- 63% of D&R partners hold patents -37% do not hold any patent
- No patent
 - No time and money to do so
 - 78% are small companies (2-10 employees) and medium (11-50) companies



Distribution according to number of patents

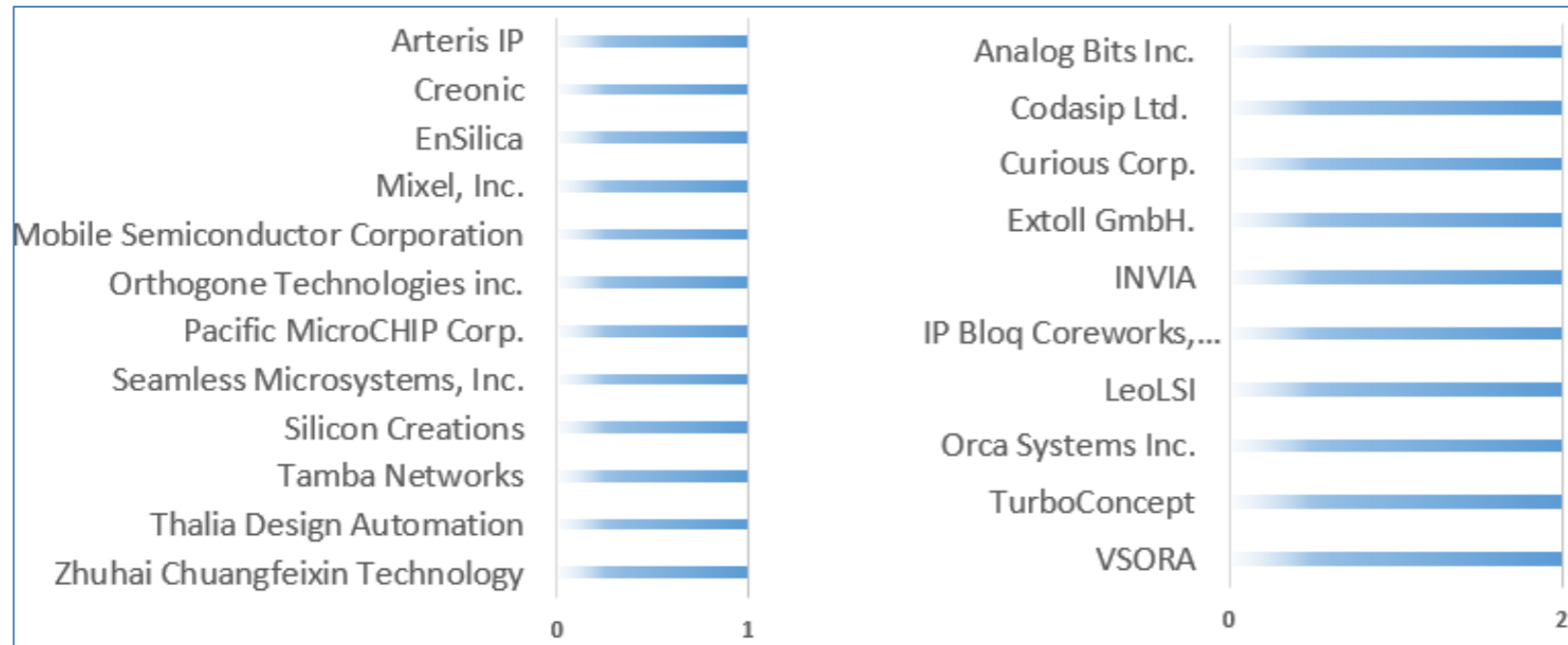
63% of D&R partners hold patents

- How many ?
 - Innovators will perform few “key” patents deposit to prove their innovation
 - When becoming established innovation consolidated by a “patent portfolio”
 - Large companies have a specialized departments to do so
 - Extra large companies may deploy a “patent war”(not only IP)



Category 1:Extra small number of patents (1,2)

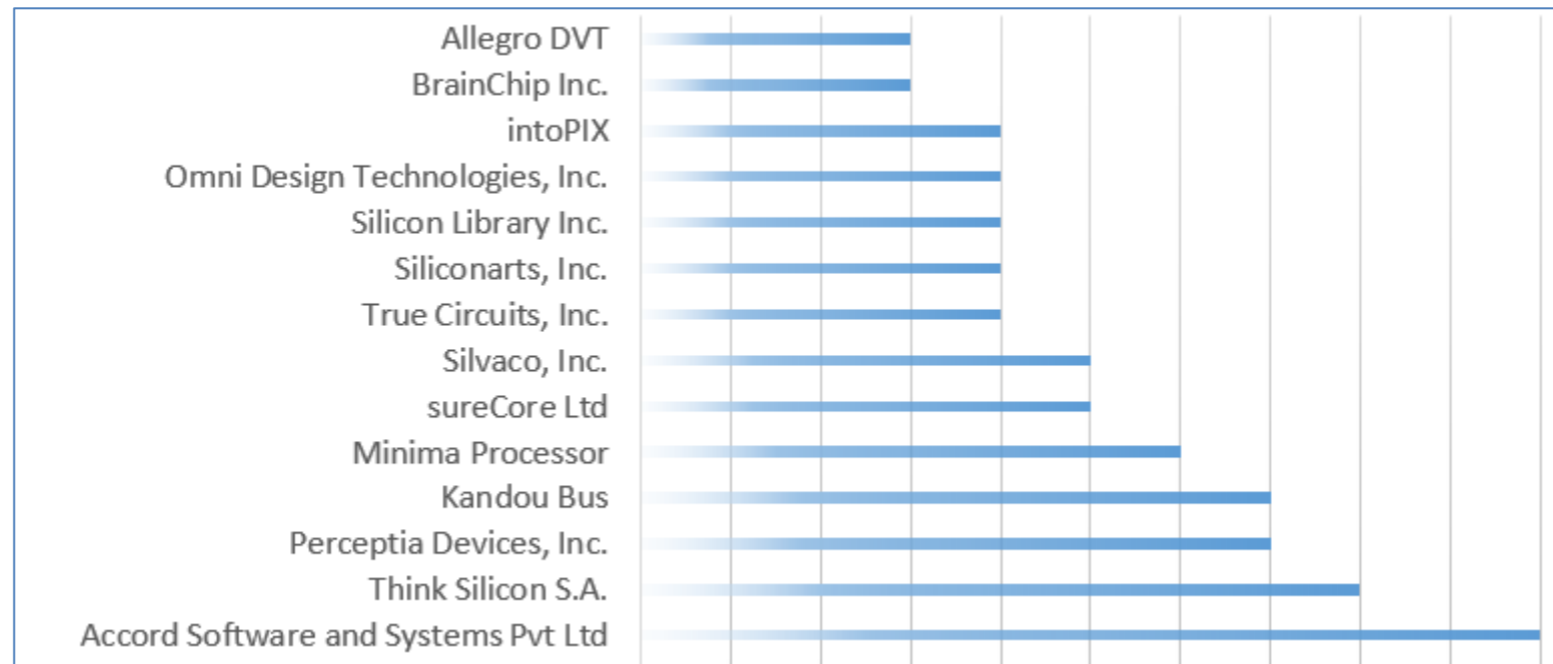
- Small companies, start up
- Design center with analog IP
- Adding IP business from an existing activity (EDA ,system design)



Small Number of patents (up to 10)

Innovation centric

- Consolidated Technology innovation (Kandy Bus,Silicon library)
- Video/image (Allegro, Intopix))
- AI (Brainchip)
- Processor ,GPU (Minima , Silicon Arts)
- Avionics (Accord software)



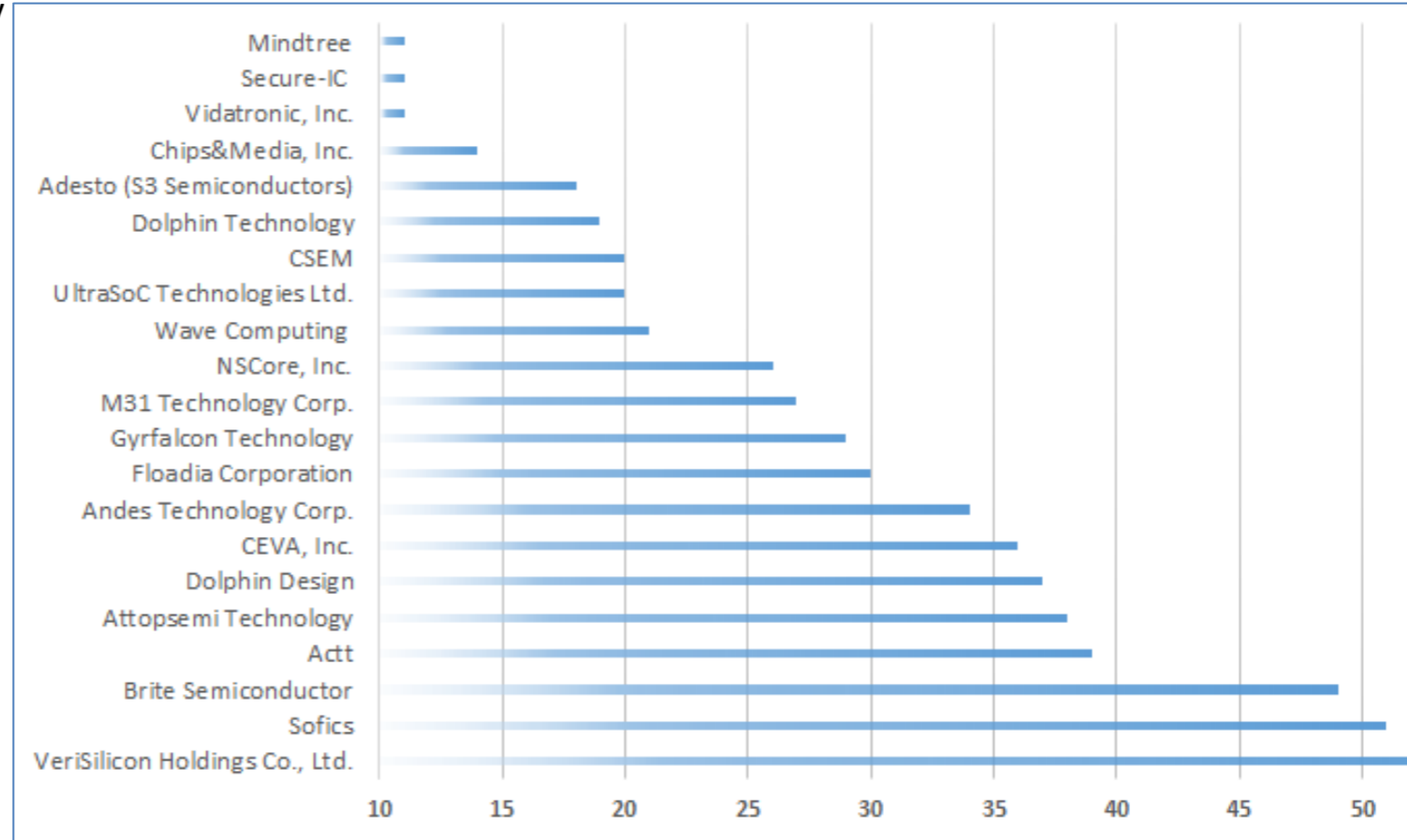
Number of Patents (10 to 50)

“Established “ IP provider highly specialized

- Technology innovation supported by larger companies (NSCore, Sofics, Floadia)
- Proven Design center (Dolphin technology
Dolphin design, Brite Semi, CSEM)
- Application centric
Video (Chip& Media), DSP (Ceva)

Other characteristics

- New area (AI) & Venture supported
(Gyrfalcon)
- Encouraged by Asian “patent” culture :
Chinese young or established players
(M31,Andes technology, Verisilicon ,
attopsemi, Acct)



Providers with large number of patents

Chip/Custom chip provider (not just IP provider). Difficult to filter IP centric patent

- Sunplus ,Delta systems ,SST (microchip subsidiary)

Foundry related design center

- Faraday ,eMemory

Finally 3 “star IP” providers with a big number patents

- **Rambus ,Imagination ,Arm**

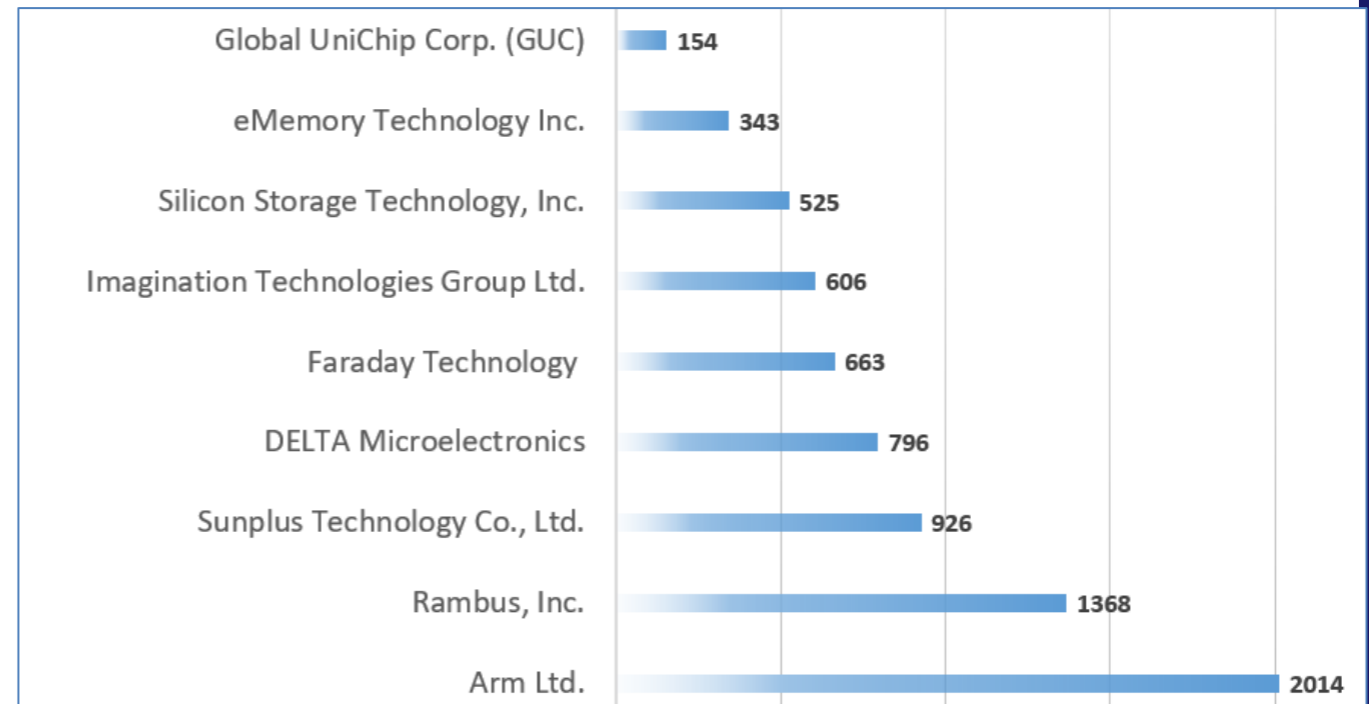
Note

EDA vendors (Mentor, Synopsys, Cadence ,Silvaco)

& Foundries (TSMC)

are not listed .

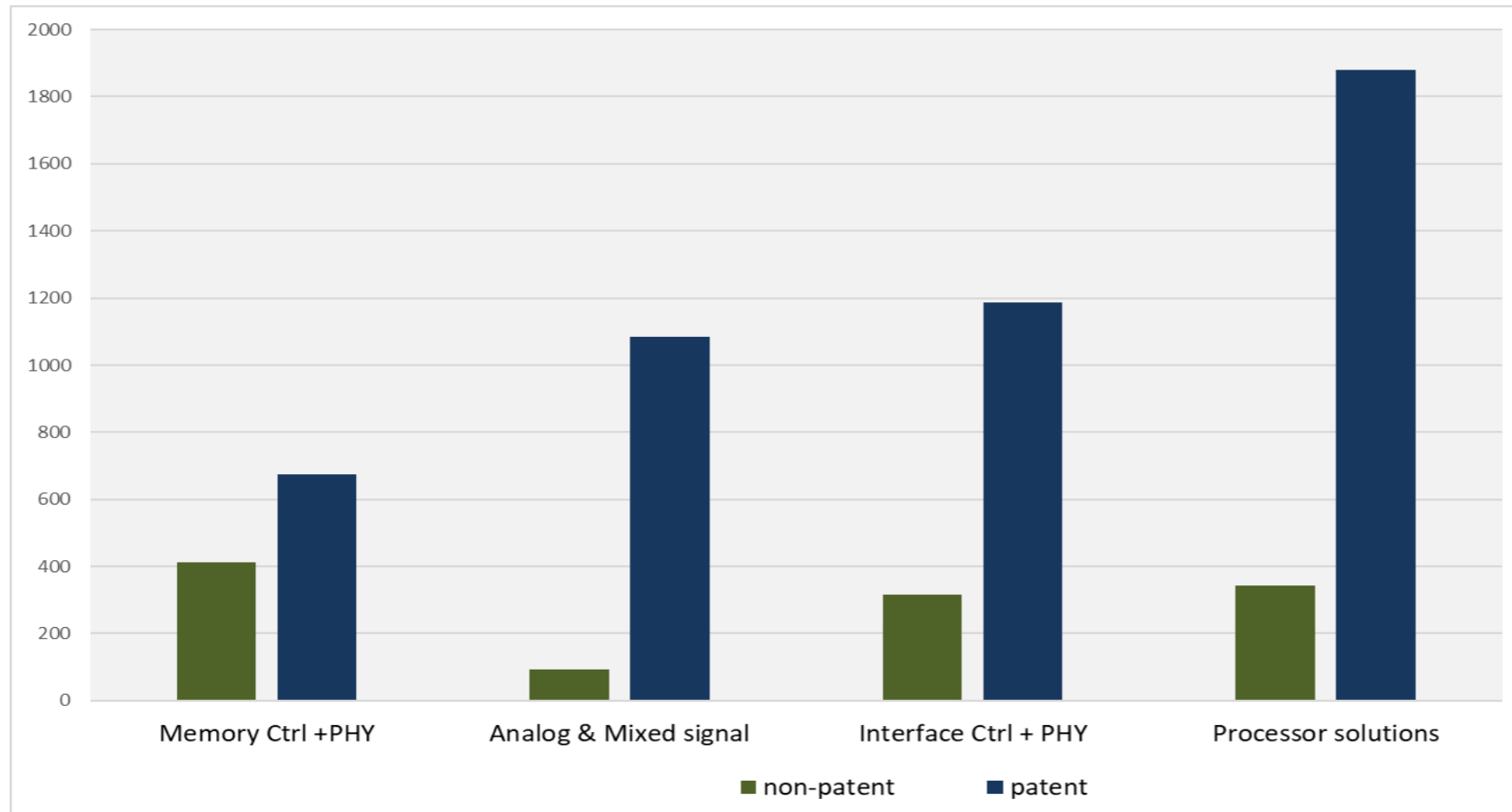
- *Non IP centric patents*
- *Large portfolio*



Correlation between patent and web attraction?

Analysis per category

- Most of the traffic (but not all) goes to IP from providers holding patent
 - Analog design
 - Especially when going to complex iP



Study Case: Processor solutions

Patent holders

Subcategory	IP Name	Provider
AI Processor	DPU for Convolutional Neural Network	Xilinx, Inc.
	Machine Learning Processor	Arm Ltd.
	Neuromorphic IP	BrainChip Inc.
IoT Processor	Convolutional Accelerator for Convolutional Neural Networks (CNN)	iBex Logic
	Full eNB-IoT Release 14 IP solution with multi-constellation GNSS support for IoT devices	CEVA, Inc.
	IEEE 802.11ax MAC/PHY for STA	Comsis
Processor Cores	RISC-V Processor - 32 bit, 3-stage	Codasip Ltd.
	Smallest, Lowest Power ARM Multicore Applications Processor	Arm Ltd.
	Ultra Compact 32-bit RISC-V CPU Core	Andes Technology Corp.
Audio Processor	Neural network-based speech recognition technology for voice assistants and IoT devices	CEVA, Inc.
	Multipurpose Hybrid DSP and Controller Architecture Family	CEVA, Inc.
	Tensilica HiFi 5 DSP for AI Speech and Audio Processing	Cadence Design Systems, Inc.
CPU	RISC-V SOC Platform	Mobiveil Inc.
	Ultra Compact 32-bit RISC-V CPU Core	Andes Technology Corp.
	Arm Cortex-a77	Arm Ltd.
DSP Core	Full eNB-IoT Release 14 IP solution with multi-constellation GNSS support for IoT devices	CEVA, Inc.
	Multipurpose Hybrid DSP and Controller Architecture Family	CEVA, Inc.
	Software-Compatible DSPs For Radar, Lidar and 5G Applications	Cadence Design Systems, Inc.
Microcontroller	Super-Fast 8051 Microcontroller Core with Configurable Features and Peripherals	CAST, Inc.
	Floating Point Processor for Embedded Systems	Cortus SAS
Security Processor	Near-threshold voltage and ultra-wide dynamic voltage and frequency scaling (UW-DVFS)	Minima Processor
	Very Low gate Count, Hardware level, Software Data Isolation and Master level Data protection engine.	Green IP Core
	Transaction-aware embedded cybersecurity solution that can detect, block and record attacks, & prevent propagation	UltraSoC Technologies Ltd.

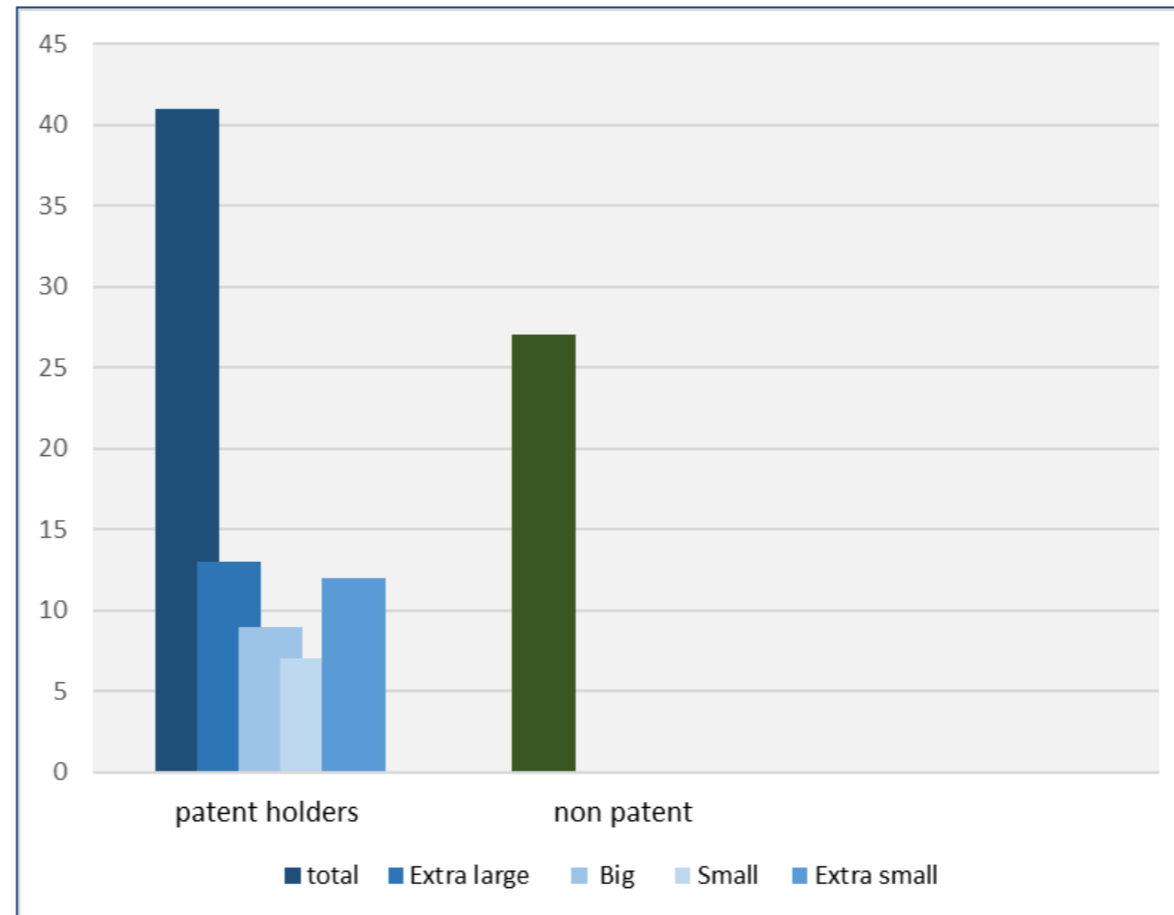
Most Popular IP

All IP

- 40% of the most popular IP are not covered by patent
 - Innovative IP from small company have their chance
- 60 % of the most popular IP are provided by patent holders

D&R web sites serves both

- small innovators
- established major providers



D&R initiative :Patent Panel

Goal

- Making available promptly information about patent status of D&R partners
- IP scouting :a selection choice? Some IP consumers may be interested in knowing promptly the patent portfolio of a provider

Filter On:

Assignee	Nb of Patents ▲▼	Company Size ▲▼	View More	Patent Application Number	
Arteris IP	1	51-200		GB2534992B	Configurable snoop filters for cache coherent system
Creonic	1	2-10		EP3086474B1	Method for controlling a check node of a nb-ldpc d
EnSilica Limited	1	51-200		US9917686B2	Two point polar modulator
Mixel, Inc.	1	11-50		US10289511B2	Differential physical layer device with testing capabi
Mobile Semiconductor Corporation	1	11-50		EP2122473B1	ADAPTIVE MEMORY SYSTEM FOR ENHANCING THE P
ORTHOGONE TECHNOLOGIES INC.	1	51-200		US10447463B2	Device and method for ultra-low latency communic
PACIFIC MICROCHIP CORP.	1	2-10		US9628263B2	Signal digitizer and cross-correlation application sp
SEAMLESS MICROSYSTEMS, INC.	1	2-10		US10075133B2	Systems and methods for ring-oscillator based ope
Silicon Creations	1	51-200		US9354411B2	Receiver optical assemblies (ROAs) having photo-de
Tamba Networks, Inc.	1	2-10		US8832613B1	Tunable design of an interlaken region of an integra
Thalia Design Automation	1	11-50		US10055527B2	Yield process for analog circuit design optimization
Zhuhai Chuangfeixin Technology	1	11-50		US10128184B2	Antifuse structure in via hole in interlayer dielectri
Analog Bits, Inc.	2	11-50 11-50		US8866556B2 US8742957B2	PHASE SHIFT PHASE LOCKED LOOP MULTI-VARIABLE MULTI-WIRE INTERCONNECT

Conclusion

- IP visibility or attraction goes
 - to innovators even who have no time and money to deposit patents
 - to established providers who hold patent
 - Equally distributed about few patents and large portfolio

Electronic world need both

- resources and design skill
 - Point innovation
-
- D&R web sites serves both