

22ND ASEAN IPA 2018

Phnom Penh, CAMBODIA

The Digital Industrial Age of 21st Century



Big Data, Blockchain, the IOT, Additive Manufacturing ...



POWER



RENEWABLE
ENERGY



AVIATION



HEALTHCARE



OIL & GAS
BHGE



GE CAPITAL



GE DIGITAL

Big Data, Blockchain, 3D printing to name a few are disruptive technologies of the 21st century.

GE is one of the first digital industrial companies to explore these technologies in order to increase efficiency for ourselves and our customers at a global level, at an unprecedented scale and speed

*using a platform : **Predix**™*



General Electric: GE Store

As a result of the energy transition GE has not only seen new market dynamics and the entrance of new technologies — we have also witnessed the emergence and transformation of business models. Independent Power Producers (IPPs) have emerged, introducing the new technologies to markets through new Agreements.

“Both customers and competitors are adapting to the energy transformation. Traditional customers will need GE’s support as they reimagine their businesses, and new ones will need the solutions and know-how that only GE can provide.”

The GE Store

In the end, leaning into the future is about helping traditional and new customers thrive.

We engage the entire GE enterprise, what we call the GE Store. The GE Store is the transfer of technology, talent, expertise, and connections through GE’s diverse network of businesses and markets



GE in ASEAN in CAMBODIA



About GE in Cambodia

GE has been in ASEAN for over a century working on things that matter, bringing technology and solutions for infrastructure development to support the dynamic growth of ASEAN, and providing jobs to over 7,500 GE employees throughout the region.

It established a presence in Cambodia in 2007, developing partnerships with private and public sectors. GE businesses that have become active in Cambodia are GE Power & Water and GE Healthcare. Since 2014, GE Energy Consulting has also engaged closely with the Government for a grid study.

GE's Steam Power Systems will supply the boiler, electrostatic precipitator and steam turbine generation systems for Cambodian Energy II Co., Ltd (CEL II) 135 MW Coal Fired Power Plant at Stung Hav, Sihanoukville

Memorandum of Understanding signed between the Ministry of Mines and Energy and GE's Steam Power Systems to run digital emissions monitoring and analysis program powered by Predix

What is Digital Industrial = Digital Data + Industrial Technology

A few applications of the Digital Industrial concept

A/ Drone Data Digital Renewable Energy 1:56mn

Wind & Solar & Hydro / Tidal

<https://www.youtube.com/watch?v=xj3GlnEO7tM&list=PLxRhTjvLlyoLDo4nPmEz1trvE8ljs1ewv>

B/ Digital Marine Solutions 2:24mn

Navigation & Digital Twin & Fuel consumption-route & Predix & Autonomous vessels

<https://www.youtube.com/watch?v=h-MpdIvLv-M>

Applicable to other transportation industries

C/ Additive Manufacturing

What is additive manufacturing 1:56 mn

https://www.youtube.com/watch?v=kKQ5KwFwW_s

GE Aviation Additive Manufacturing Center 2:43min

<https://www.youtube.com/watch?v=cGGLSN6CTwI>



What is blockchain technology?

Shared database updated with a “**block**” of transactions that are **cryptographically “chained”** to the block previously entered into the system.

Future versions go beyond the chain-of-blocks data structure.

Gartner calls “**metacoin platforms**” = “beyond coin” – beyond monetary transactions to general value-exchange scenarios.

Blockchain technology = **distributed database** structure used to create a **digital transaction ledger**.

= shared database among a distributed network of independent computers.

A key aspect of blockchain technologies or metacoin platforms is that they are **programmable** and can be associated with “**smart contract**” programs that add dynamic behavior to individual transactions.

In the basic/current Bitcoin platform, these are simple scripts that are highly restricted by design.

In future platforms, a full range of programmable behaviors are supported.

The ledger **tracks the exchange of assets** reliably- including money, stocks, bonds, financial securities, houses, car titles, etc.- a more **transparent** and publically **verifiable** system.

Future blockchain technologies – or rather metacoin platforms – will be able to manage **different kinds of assets** and support different kinds of **value exchange**, but these platforms are still being constructed.

Public blockchain = an emerging market valued of \$6.5billion. It is a currency, finance, economic, smart property system – Gartner calls “**algorithmic business**”. The aggregate of algorithmic businesses is what Gartner calls “the **programmable economy**” – also sometimes called the “**internet of money**”.

Blockchain Examples: Bitcoin, Ethereum, Chain.com, Ripple, the Hyperledger Project



What is blockchain technology? - Continued

Benefits and Promise of Blockchain

- Exclusivity, verifiability, transparency, resilience, automation
- IP protection
- Autonomous- smart contracts
- Eliminates the need to establish trust (do it yourself, the system does it)
- Reduction of risk (In banking: faster settlement → less risk → less capital requirements)
- Augmenting existing business networks
- Immutable, irrevocable
- Secure
- Auditability

Blockchain technology is prompting us to rethink economic principles in markets, and apply them to other situations in a non-monetary sense

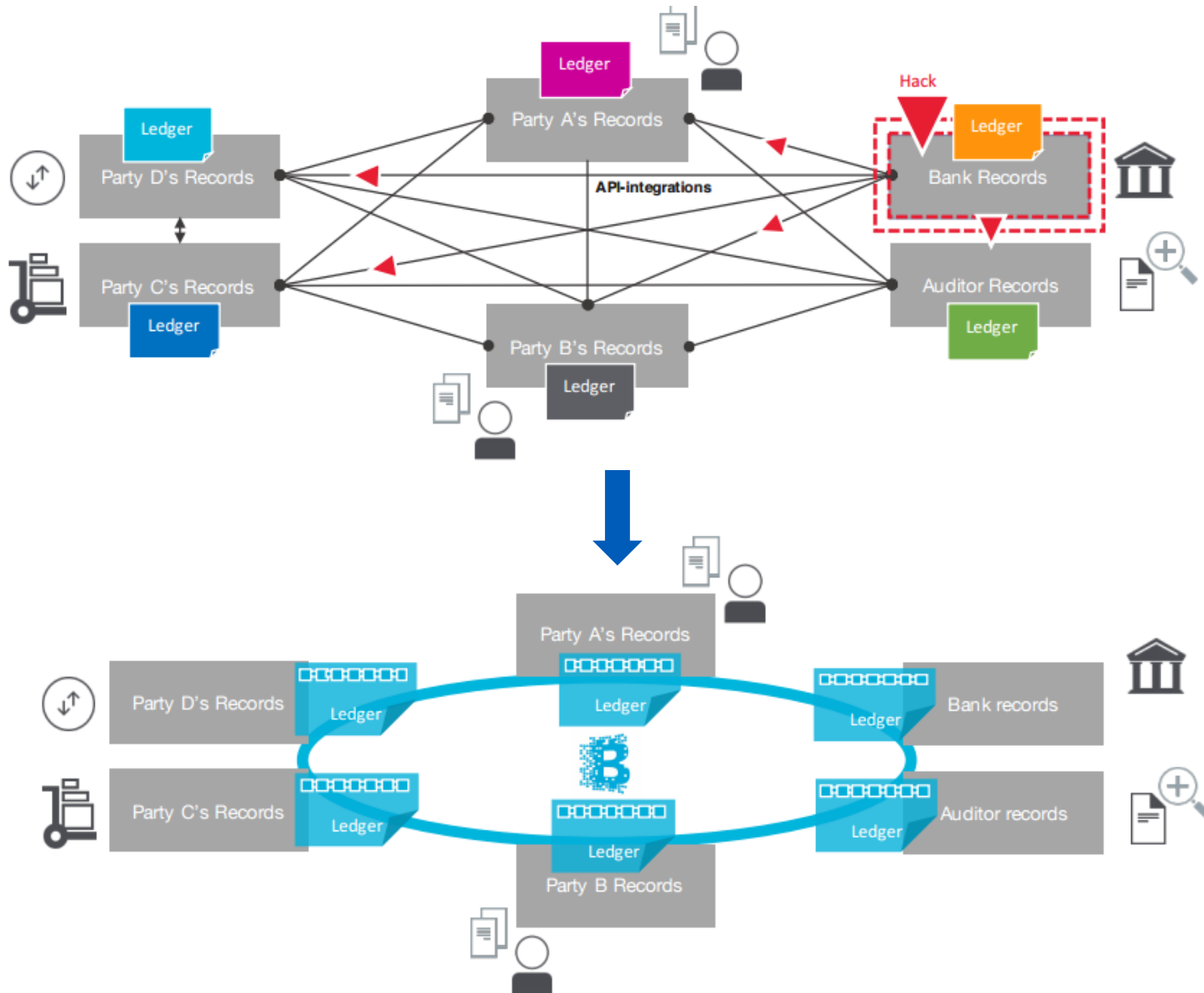
Cons of Blockchain

- The legitimacy of privacy and safety are concerns.
 - **The DAO project (decentralized autonomous organization)**, was recently hacked, potentially a \$50mm loss.
- Private keys control identity, if they are lost, identity and money can be lost.
- Variability in cost of implementation.
- Need for technology and platform consistency across companies and use cases
- Possibility/potential overlaps with Predix?
- Regulatory implication on underlying asset or contract
- Relatively unknown technology with known scalability and flexibility constraints.



Blockchain: One distributed ledger

Reduces Handoffs, Reduces latency, Increased Data Consistency->Distributed shared repository, Enhanced trust. Reduces Integration Work.



Potential applications of Blockchain

Financial Services

- Payments
- Securities registration & processing
- Lending
- Loans & Bonds

Internet of Things

- Autonomous devices
- Cars, drones, robots
- Healthcare assets
- Turbines? Engines?

Governmental Services

- Voting
- Registration
- Permits

Identification & Security

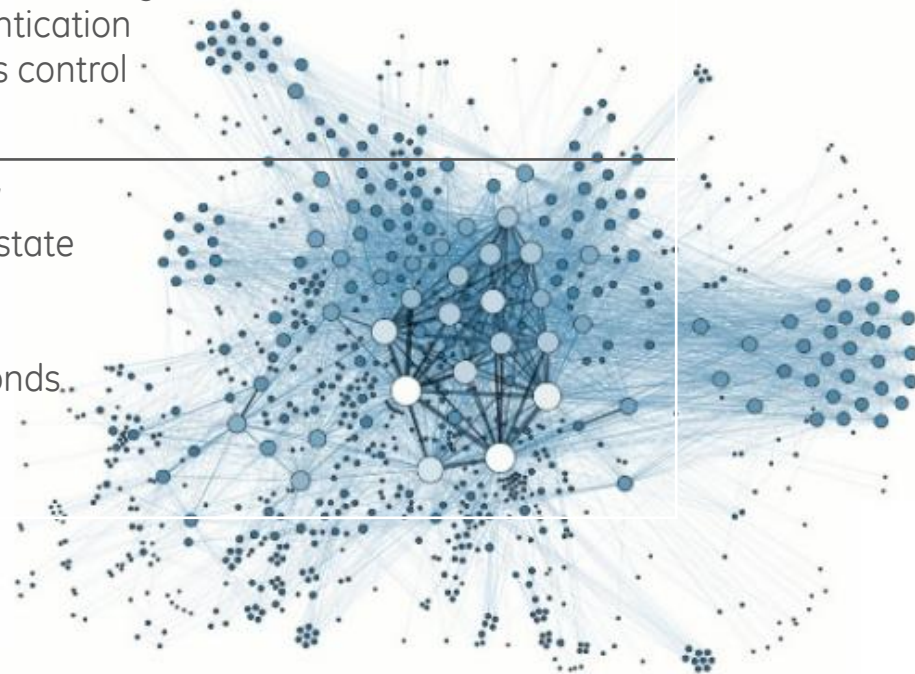
- Party/device registration
- Authentication
- Access control

Trade

- Document exchange
- Asset exchange
- Escrow services
- Trade agreements
- Smart contracts
- Flow of goods (logistics)

Property

- Real Estate
- IP
- Cars
- Diamonds
- Art



Companies & Blockchain

The Hyperledger Project

Growing collaborative effort created to advance Blockchain technology,
Open source distributed ledger framework and code base led by Linux Foundation and IBM, in February 2016.
Global collaboration in Finance, Banking, Internet of Things, Supply Chains, Manufacturing and Technology
IBM: "Applying the blockchain concept to the world of [Internet of Things] offers fascinating possibilities.

Financial Institutions

Goldman Sachs, Capital One, Chase, JP Morgan, Wells Fargo, State Street, NYSE, London Stock Exchange Group, Nasdaq, Overstock, etc.
Most recently R3 completed a trial of five blockchain technologies involving trading fixed income assets between 40 banks. Alisa DiCaprio, Head of Research at R3.

Technology Companies and Industrial Applications

Microsoft (Azure BaaS), Digital Currency Group, Filament, SkuChain, Everledger
SkuChain- connecting the flow of goods with the flow of money using blockchain technology.
Everledger- Diamond platform - using blockchain for provenance and asset tracking

Startups

applications to cloud storage,
smart contracts,
anti-counterfeiting,
digital identity,
supply chain,
art & ownership, and
the Internet of Things.



Blockchain and Industrial Applications

Already, companies are investing in applications of blockchain technology for the industrial sector. The following areas of industry can and will be disrupted through blockchain technology capabilities..

Smart contracts

- Uses “if-then” computer programming to automatically fulfil contracts
- Increase efficiency in industry,
- Disrupt areas of work such as legal functions
- *Ethereum*

Internet of Things

- Device communicates with one another without a central control system needed for identification
- Devices autonomously control software updates, bugs, energy management
- IBM and Samsung’s ADEPT concept uses blockchain for IoT network
- *Filament*

Forecasting

- Services to offer creating a “predictions market”
- Disrupt research, analysis and consulting industries

Supply Chain- a \$40 trillion industry

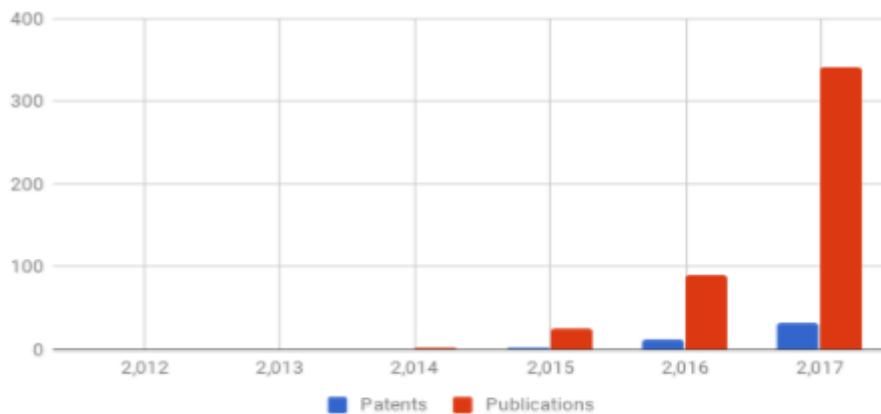
- Unlock \$ contained in Letters of Credit,
- Smart contracts to supply chain management
- Connects consumers directly to the supply chain. forming a “supply circle”
- Make global supply chain remotely visible through tracking
- *SkuChain, Open Trade docs (open source approach to supply chain finance process), Everledger*



Patent – Stats - Landscape

- The Age of Cryptocurrency: How Bitcoin and Digital Money Are Challenging *Blockchain Revolution: Technology Behind Bitcoin is Changing Money, Business and the World.*
- Bitcoin: a type of digital currency in which encryption techniques are used to regulate the generation of units of currency and verify the transfer of funds, operating independently of a central bank.

Patents and Published Applications for keyword "Blockchain"



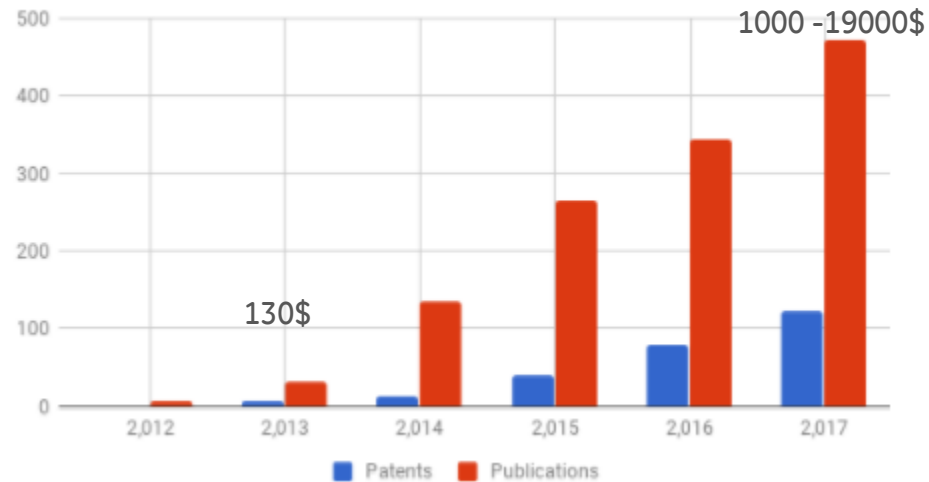
Top Assignees for Blockchain

Number of Published applications or patents

Bank of America	30
Mastercard International	16
Fidelity Management and Research	14
International Business Machines	12
402 Technologies SA	11



Patents and Published Applications with Keyword "Bitcoin"



Top Assignees for Bitcoin

Number of Published applications or patents

Game Play Network	73
Bank of America	42
International Business Machines	42
Elwha LLC (Intellectual Ventures)	39
United Parcel Service of America (UPS)	38

Patent – Stats - Landscape

Number of patents	Publication countries/ Priority years	Before 2000	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
665	US	36	16	21	49	36	53	64	46	58	54	75	63	68	86	96	170	232	113	18
410	WO	32	8	12	18	18	42	47	39	39	39	55	25	41	58	58	119	166	63	9
405	CN	4	5	2	12	22	36	54	30	37	42	58	29	32	63	70	83	71	92	15
263	EP	33	10	8	19	30	40	54	27	35	35	53	26	25	50	57	91	62	14	
164	JP	37	12	14	14	11	14	19	18	25	9	38	21	3	6	18	16	12	1	3
156	AU	26	8	9	17	10	27	34	18	9	20	41	18	16	37	35	70	57	12	1

Number of patents	Priority countries/ Priority years	Before 2000	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
589	US	25	11	19	39	29	54	63	44	48	42	59	51	64	80	94	160	227	128	18
199	CN	2						1	4	3	8	7	5	13	24	16	13	23	90	15
142	WO	16	3	1	8	9	13	17	20	24	25	29	21	19	23	24	45	35	17	7
68	AU	0					20	34	14		18	18		14	35	30	56	43	7	1
67	JP	16	3	2	1	3	2	2	8	14	8	7		1	3	6	8	9		3
44	KR	0					1		2	5	6	5	3		5	2	8	10	3	
43	EP	4	4	2	1	1	2	8			1	2	1		1	7	5	9	8	

Books

- The Age of Cryptocurrency: How Bitcoin and Digital Money Are Challenging the Global Economic Order, Pall Vigna and Michael J. Casey (The Wall Street Journal)
- *Digital Gold: Bitcoin and the Inside Story of the Misfits and Millionaires Trying to Reinvent Money*, Nathaniel Popper
- *Blockchain Revolution: How the Technology Behind Bitcoin is Changing Money, Business and the World*, Don Tapscott, Alex Tapscott
- *Blockchain: The Simple Guide To Everything You Need To Know*, Jacob William



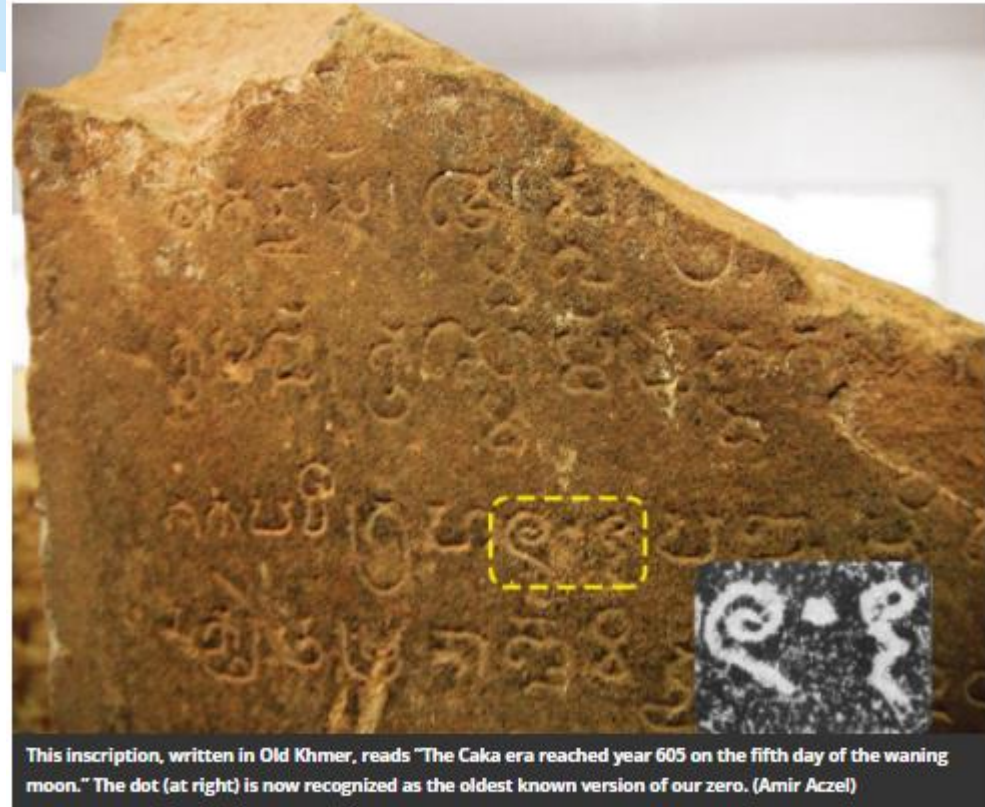
Digital Stone Age: "0" Khmer invention

Stone Printing

Stone Historic Data

The Origin of the Number Zero

Deep in the jungle, an intrepid scholar locates a symbol of power and mystery



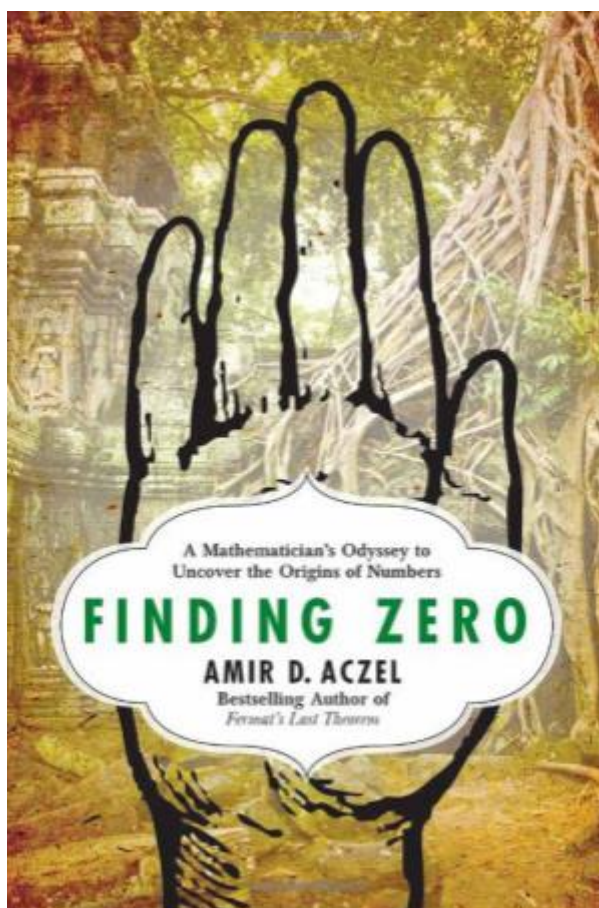
This inscription, written in Old Khmer, reads "The Caka era reached year 605 on the fifth day of the waning moon." The dot (at right) is now recognized as the oldest known version of our zero. (Amir Aczel)

By [Amir Aczel](#)
SMITHSONIAN MAGAZINE | [SUBSCRIBE](#)
DECEMBER 2014

The number 605 in Khmer numerals, from the Sambor inscription (Saka era 605 corresponds to AD 683). The earliest known material use of zero as a decimal figure.

Stele K-127 (khmer ancien du 7ème siècle) avec la date 605, le zero étant un point

Book



The invention of numerals is perhaps the greatest abstraction the human mind has ever created. Virtually everything in our lives is digital, numerical, or quantified. The story of how and where we got these numerals, which we so depend on, has for thousands of years been shrouded in mystery. *Finding Zero* is an adventure filled saga of Amir Aczel's lifelong obsession: to find the original sources of our numerals. Aczel has doggedly crisscrossed the ancient world, scouring dusty, moldy texts, cross examining so-called scholars who offered wildly differing sets of facts, and ultimately penetrating deep into a Cambodian jungle to find a definitive proof. Here, he takes the reader along for the ride.

The history begins with the early Babylonian cuneiform numbers, followed by the later Greek and Roman letter numerals. Then Aczel asks the key question: where do the numbers we use today, the so-called Hindu-Arabic numerals, come from? It is this search that leads him to explore uncharted territory, to go on a grand quest into India, Thailand, Laos, Vietnam, and ultimately into the wilds of Cambodia. There he is blown away to find the earliest zero—the keystone of our entire system of numbers—on a crumbling, vine-covered wall of a seventh-century temple adorned with eaten-away erotic sculptures.



Angkor South East Asia Network

ANGKOR P.A.T.

People Arts Technologies

- 9th April 2018 at the ITC (Institut Technologique du Cambodge)
Phnom Penh
- Mid November (12-14?) 2018 – in Phnom Penh with the participation of EPO

Thank you

谢谢

Merci

ありがとう

Danke

감사합니다

Gracias

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Obrigado

धन्यवाद

cảm ơn

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