ARTiFACTS

BUILDING THE LEDGER OF RECORD FOR RESEARCHERS AND SCIENTISTS

ARTiFACTS Overview

Discussion Document

4/26/2018

CONFIDENTIAL – DO NOT DISTRIBUTE – PATENT PENDING

WHAT IS ARTiFACTS?

- ARTiFACTS provides a simple, user-friendly collaboration platform, purpose built for academic and scientific research that leverages blockchain technology
- Researchers can record a permanent, valid, and immutable chain of records in real-time, from the earliest stages of research for all research artifacts, including citing/attribution transactions

Launched March 19

THE ARTiFACTS PLATFORM

Enabling Researchers & Scientists To Do Three Simple Things:

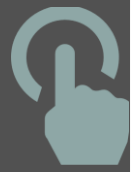
- Establish proof-of-existence and confirm provenance at any time
- Protect and manage intellectual property (IP) while concurrently facilitating knowledge and content sharing
- Provide and receive valid, break-proof attribution and assignment of credit

CI·TA·TION

sī’tāSH(ə)n/

The Mertonian description of normal science describes citations as the currency of science. Scientists make payments, in the form of citations, to their preceptors— *Eugene Garfield, 1962*

A MAKES SHARING EASY, SAFE AND BENEFICIAL-- DRIVING BEHAVIOR CHANGE



EASY

- specifically for
  r workflows
- with leading
  forms
-

SAFE

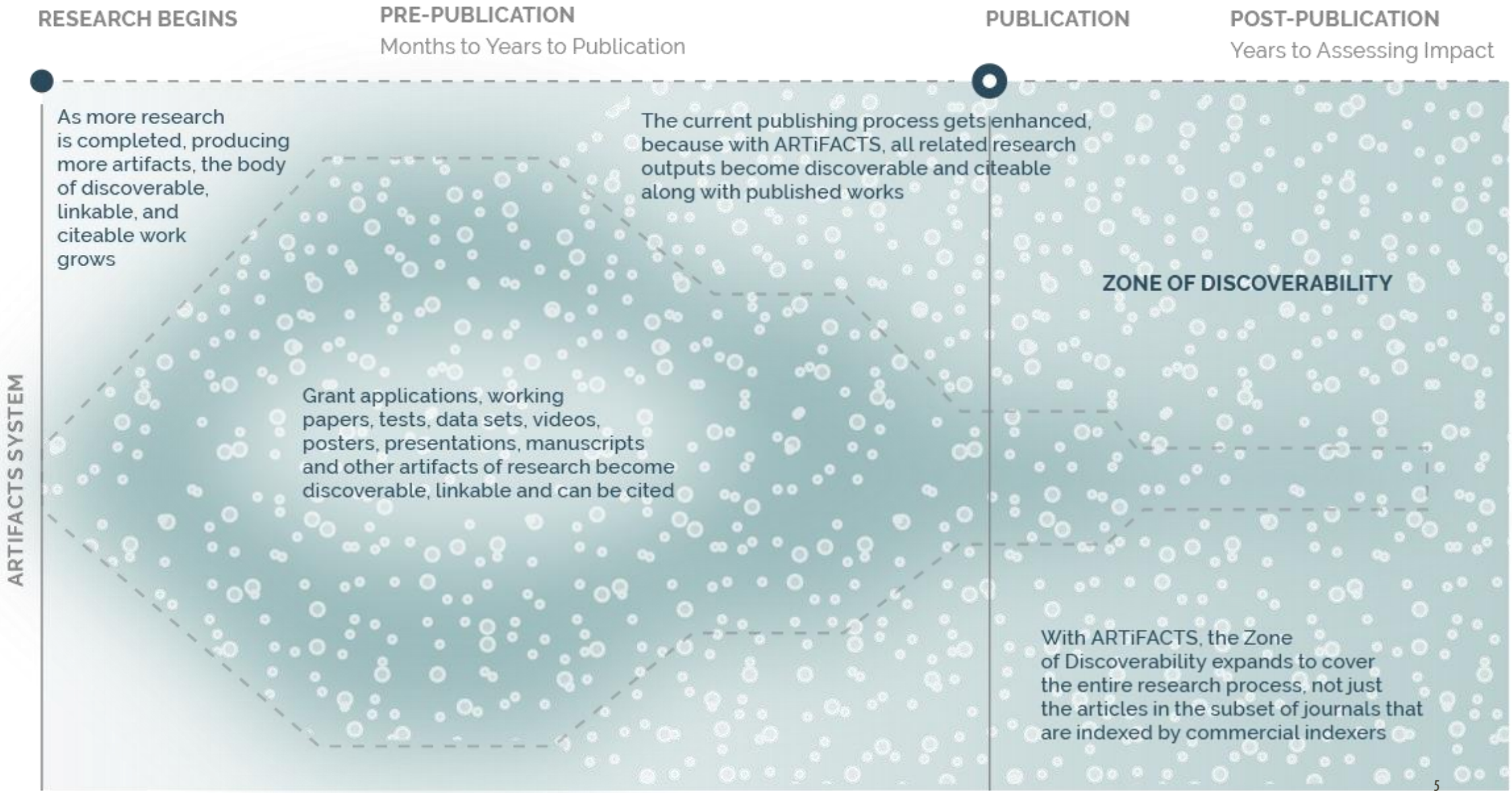
- Cryptographic hashing and time stamping
- Anonymous or public
- DRM via smart contracting (future)

BENEFICIAL

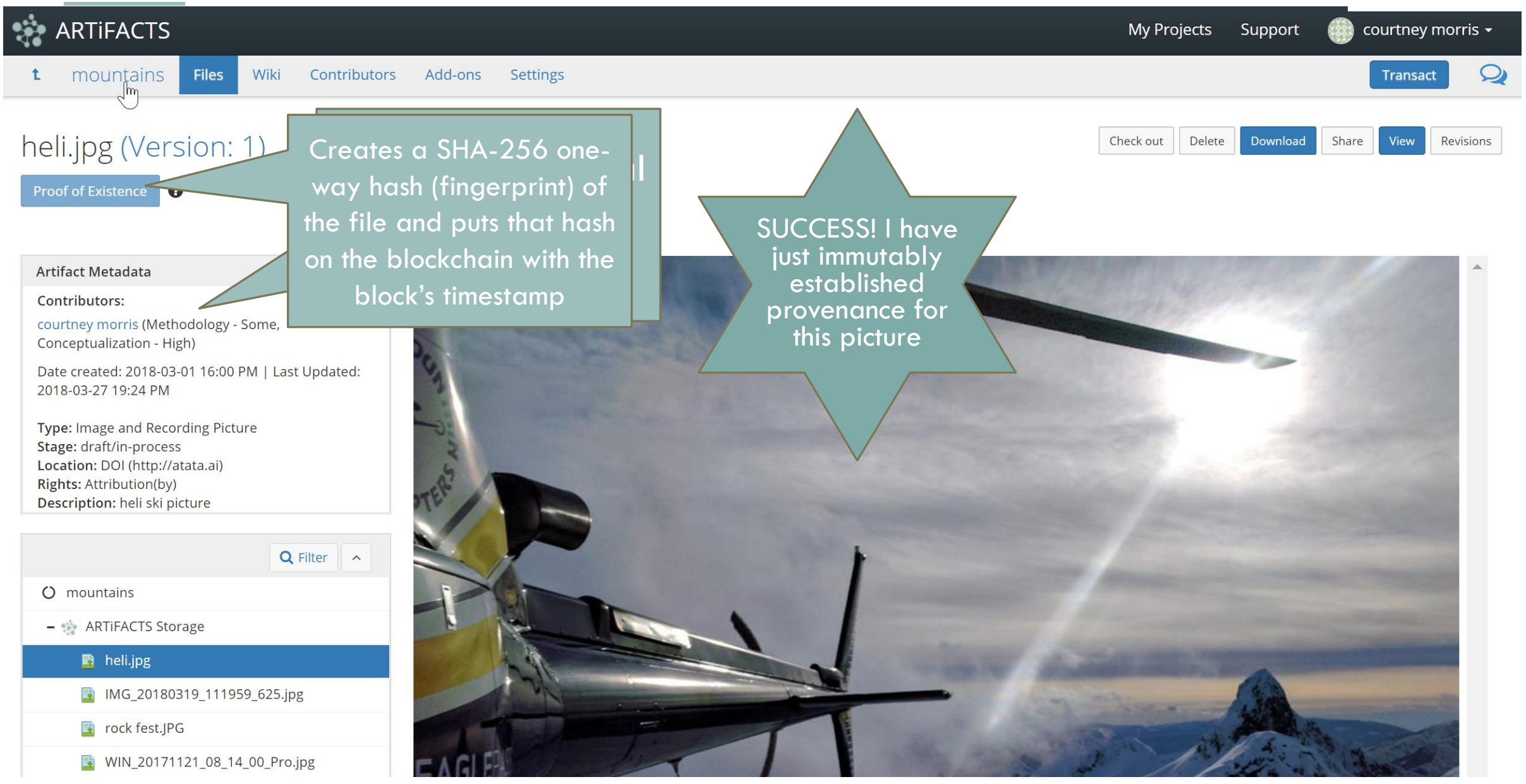
- Build reputation immediately
- Find collaborators
- Speed research

THE ARTiFACTS' SYSTEM LIBERATES KNOWLEDGE AND BUILDS REPUTATIONS IN REAL TIME

ARTiFACTS ENABLES FASTER, MORE COLLABORATIVE RESEARCH, EXPANDING KNOWLEDGE



HOW DOES IT WORK: EXAMPLE, ESTABLISHING PROOF OF EXISTENCE



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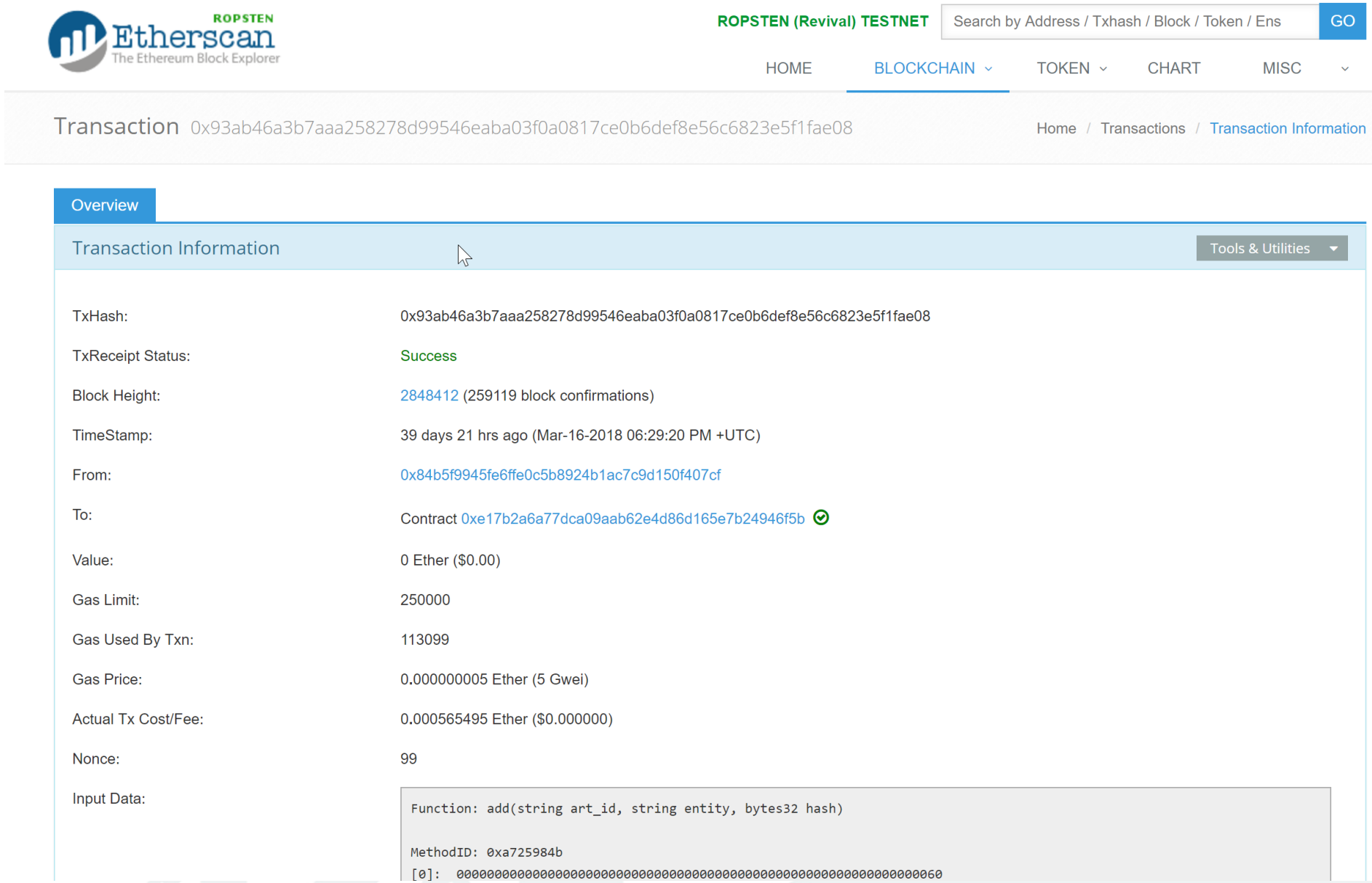

FOUNDERS

Kevin McCurry

25+ years across technology and information industries
Former CSO, Thomson Scientific

Courtney Morris

25+ years experience including healthcare and life science information businesses
Former CSO Thomson Healthcare

George Moore

25+ years across Publishing/technology, SAAS businesses
Former CTO, Elsevier

Dave Kochalko

30+ years in technology and information industries focused on science and academia
Co-Founder ORCID

Marcos Blanco

12+ years experience in media and technology including M/A, VC and start-ups

THOMSON REUTERS · BERTELSMANN · SUNGARD · DRG · iVantage HEALTH ANALYTICS · CENGAGE Learning · ELSEVIER · ORCID Connecting Research and Researchers · ISI Web of SCIENCE · EndNote · BDMI · RANDOM HOUSE

ADVISERS

Bruce Stangle
Chairman & co-founder, Analysis Group

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Executive Director, Chorus. Former Nature CTO

Jeremy Kaufman
CEO, LBRY – a blockchain content company

Jan Scheufen
Chief Product Officer, Monax– an enterprise blockchain company

Nancy Kassam-Adams
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Ron Dixon
Head of Clinical Affairs at Onduo

ARTiFACTS

www.artifacts.ai

THANK YOU

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WHY SHOULD YOU CARE?

- Publishers have an opportunity to add value to the community by adopting new technology and leading on addressing known issues
- Adding additional knowledge/history to a published article – while supporting the enhancement of the researcher's reputation – concurrently builds the reputation of the journal & the publisher

Reputation & Recognition

The NEW ENGLAND JOURNAL of MEDICI

Variations in Databases Used to Assess Acade
Citation Impact

N Engl J Med 2017; 376:2489-2491 | June 22, 2017 | DOI: 10.1056/NEJMc1616626

"Online scientific databases are i
evaluate academic productivity.
discrepancies among database
recognition and professional ac
academicians."

"There were significantly more c
for faculty with Ph.D.s than for th
D.D.S.s, and dual degrees. These
significantly with increased aca

Research Integrity

nature

China cracks down on fake peer revi

Funding agencies announce harsh penalties and stronger policin

David Cyranoski

"The Chinese government is going
scientists who dupe journals by cr
reviews of submitted papers. A c
by the science ministry announced
government would suspend the g
involved in such fraud, which surfa
when a cancer journal retracted 1
Chinese authors."

"[A Chinese Researcher] says that
cannot be excused, other factors a

Peer Review

JOURNAL OF THE ROYAL SOCIETY OF MEDICINE
JRSM

Peer review: a flawed process at the journals

Richard Smith

"THE DEFECTS OF PEER REVIEV
evidence on the effectiveness o
considerable evidence on its de
poor at detecting gross defects
detecting fraud it is **slow, expen**
academic time, highly subjective
prone to bias, **and easily abused**

Reproducibility

THE SCHOLARLY kitchen

Reproducible Research, Just Not Reproducible By You

By DAVID CROTTY | MAY 24, 2017

"At the recent STM Annual Meeting in
Pritsker, founder and CEO of the Journ
Experiments (JOVE) gave a talk about t
present in efforts to drive scientific rep
Enormous amounts of effort, money, a
been put toward opening up the data b
experiments. But very **little attention s**
directed toward the protocols and m
to collect those data."

"If I want to reproduce your experimen

Data Access

PLOS ONE
A peer-reviewed, open access journal

Data Sharing by Scientists: Practices and Perceptions

"Nearly two thirds (67%) of the respondents agreed that lack of access to data generated by other researchers or institutions is a **major impediment to progress in science**"

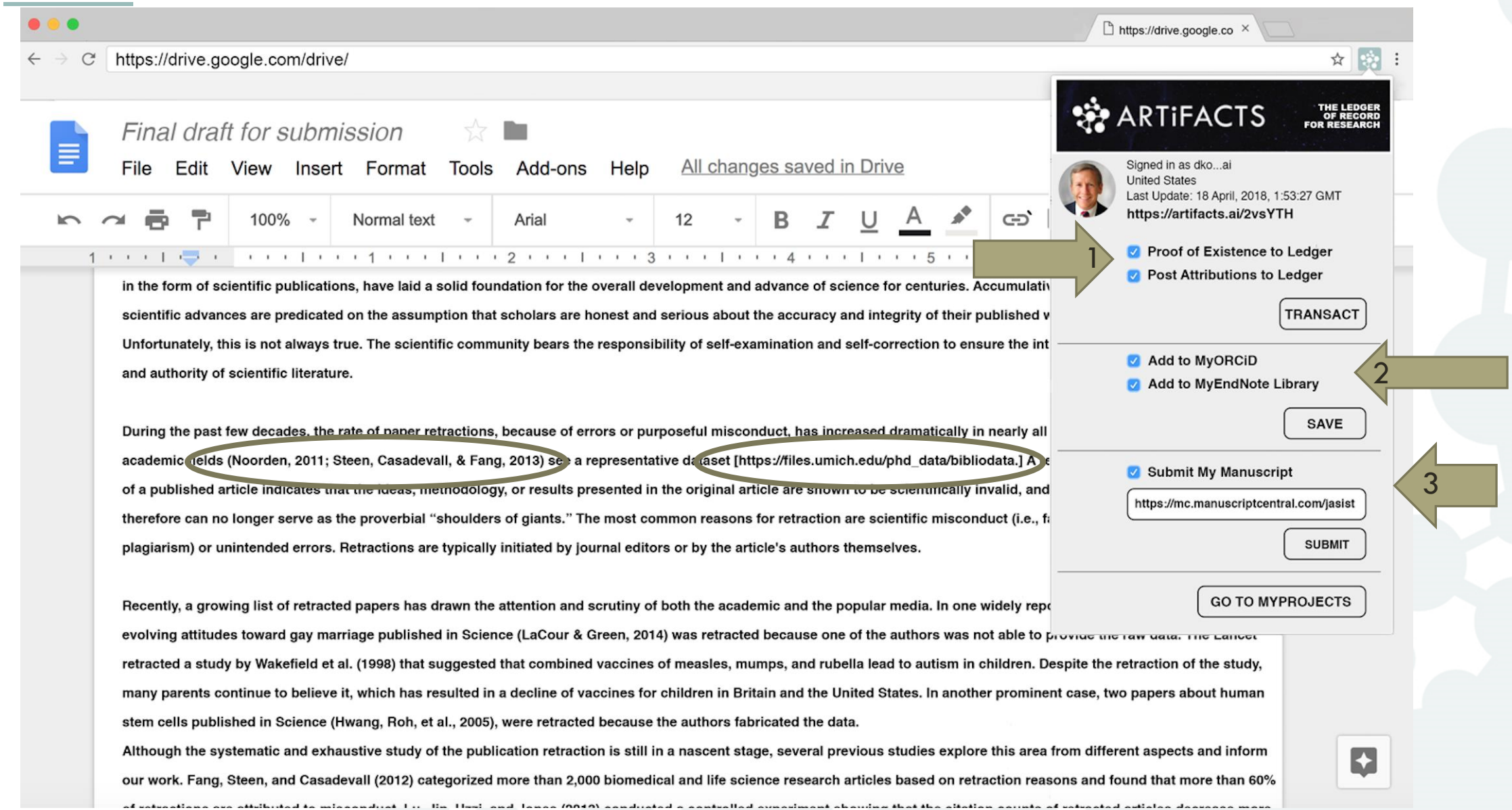
"The high percentage of non-respondents to this question [of data sharing] most likely indicates that **data sharing is even lower than the numbers indicate.**"

"A vast majority (93%) find it a fair condition to use other people's data if there is **formal acknowledgement**... in all disseminated work making use of the data and 95% of the respondents reported that they find it fair to use other people's data if there is **formal citation...**"

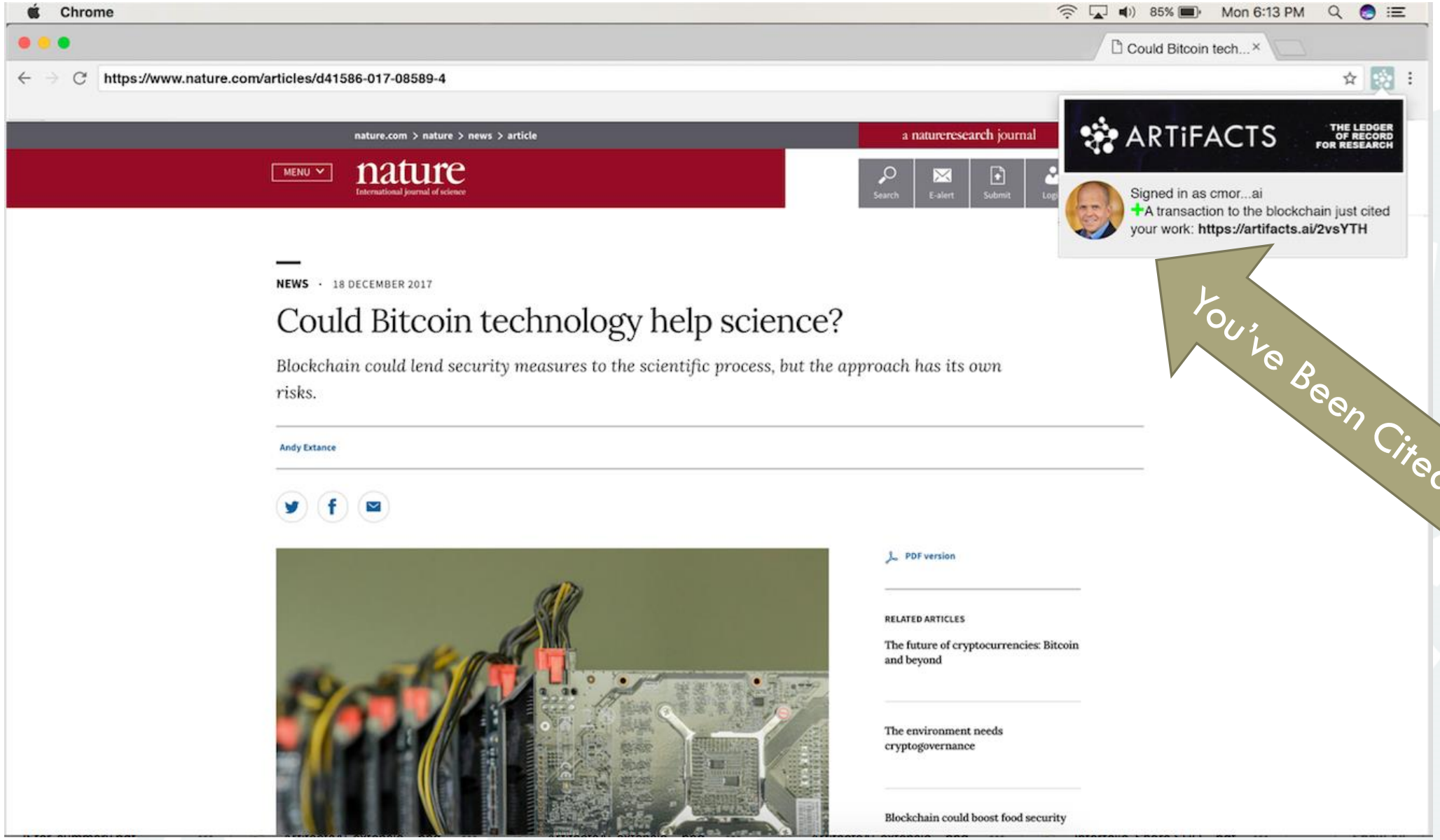
WHAT ARE SOME USE CASES FOR YOUR CUSTOMERS?

- ENHANCE PEER REVIEW – enable peer review to efficiently consider corroborating evidence of reported findings
- DATA SHARING & REPRODUCIBILITY SERVICES – provide access to research outputs related to your authors' publications for stakeholders
- REPUTATION ENHANCEMENT – of your authors, your journals and your publishing brand
- ANALYTICS & INDICATORS – develop, test and deploy relevant indicators of improvements made addressing scholarly communications issues
- PROTECT AUTHORITATIVE CONTENT – address rogue sharing and copyright abuse

INTEGRATING ARTiFACTS INTO AUTHOR / PUBLISHER WORKFLOWS



CONFIRMING ATTRIBUTIONS DURING AUTHORING PROCESS



ARTiFACTS

www.artifacts.ai

THANK YOU

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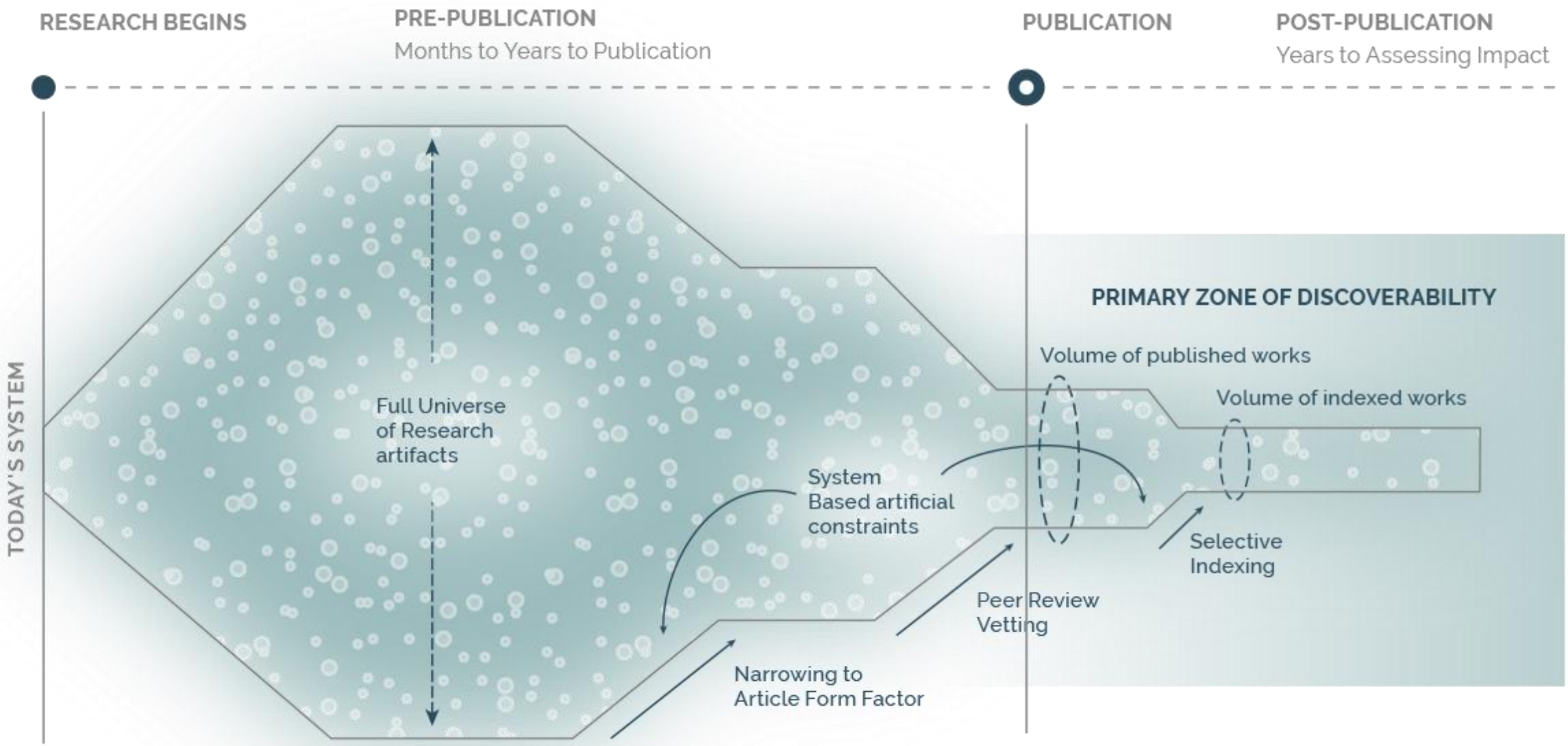
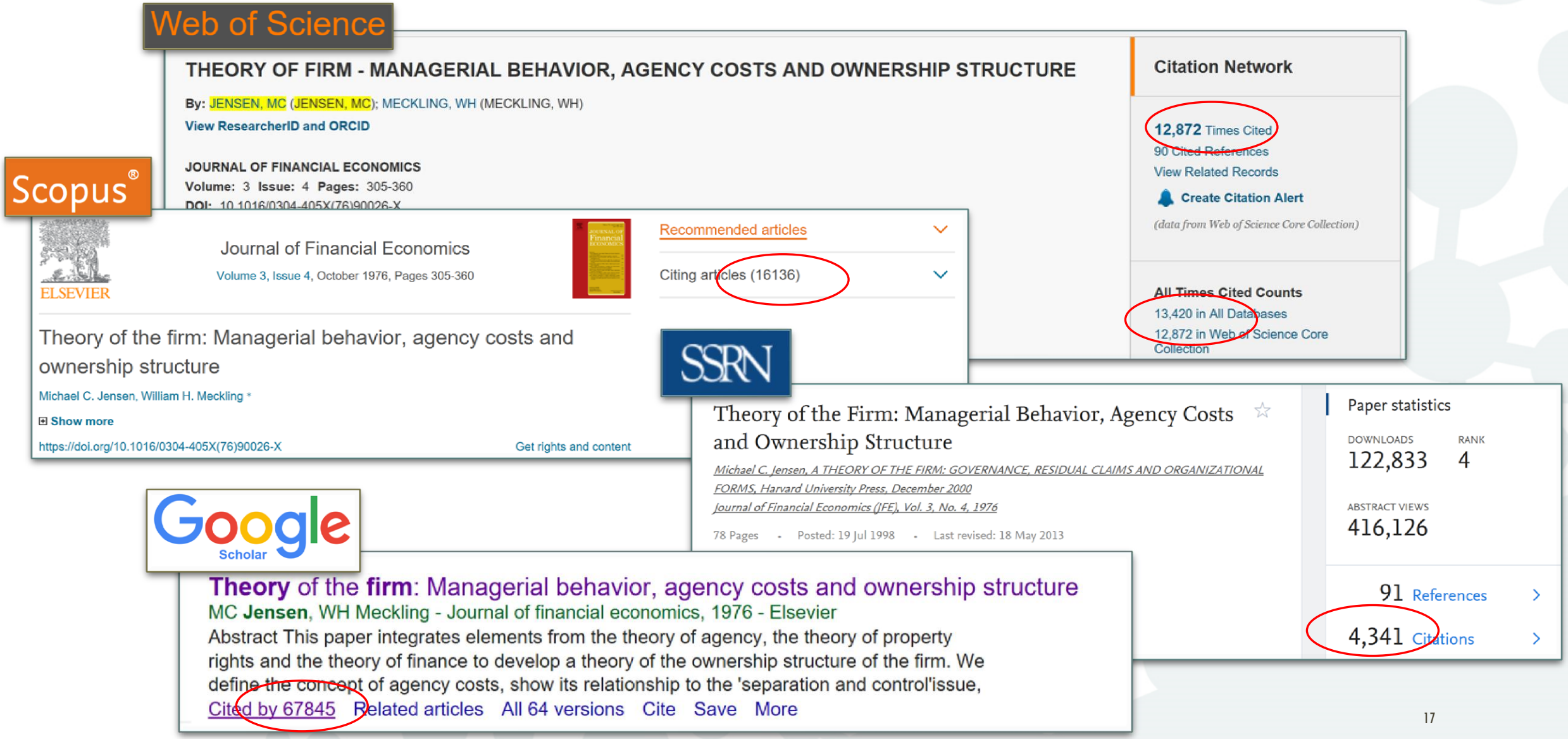
APPENDIX

TODAY'S SYSTEM CONSTRAINS & INHIBITS RESEARCH VELOCITY



WITH A BROKEN CURRENCY – WHERE NO TWO SOURCES EVER AGREE



ARTiFACTS OPERATES IN A NEW ERA WHERE THE COMPETITION DOES NOT

1.0 Database & Internet Era

Scopus WEB OF SCIENCE SSRN MEDLINE®

- Traditional Abstracting & Indexing (A&I) databases
- Historically considered 'rigorous' due to explicit coverage, editorial, and curation policies
- Limited, however, focusing only on a sub-set of published articles missing a vast corpus of research outputs
- Deeply retrospective—greatly reducing value in discovering and assessing current research
- Susceptible to editorial errors, author ambiguity, and citation breaks —tolerated as 'better than nothing'
- No source of truth—Inconsistent in policies, coverage, and methods which creates widely divergent citation counts and metrics

2.0 Social/Network Era

RG ACADEMIA MENDELEY

- Focus on sharing, researcher promotion, and collaboration—several with rapid adoption—leveraging the power of the researcher community
- Have not solved 1.0 issues and have additional persistent pain points of:
  - In-efficient/non-comprehensive citing
  - Risk of researcher loss of IP
  - Undefined/incomplete coverage
  - Potential for copyright infringement (from unintended to explicit pirating as seen with Sci-Hub)
  - Measures derived from any of these solutions ('alt-metrics') are 'soft' and lacking in rigor

3.0 Blockchain Era

ARTiFACTS

- Transforming 1.0 and 2.0, 3.0 provides both authoritative rigor (1.0) and open and collaborative (2.0) contributions which were at odds before blockchain technology. Further, 3.0 adds capabilities:
  - Covers all stages of the research cycle and all relevant research artifacts
  - Leverages the community, and technology, enabling prospective curation and meta data capture, vastly reducing resource needs
  - Provides high integrity, comprehensive, break-proof citations and artifact linkages in 'real time'
  - Unlimited scalability with no single point of failure
  - Facilitates sharing, providing proper attribution and to creators and IP protection for copyright owners
  - Rich dimensionality for citations and other metrics
  - Smart contracting for access and use rights
  - Logical capability extensions to support peer review and data management (e.g. clinical trials)
- With a natural migration path for adoption…
  - Addresses researcher needs by resolving trade-offs (e.g. sharing while protecting IP, transparency with privacy)
  - Works within existing researcher workflows
  - Capabilities and attributes that appeal to industry incumbents

OPPORTUNITIES FOR UNIVERSITIES

- **There are several areas where the ARTiFACTS system can help institutions further their missions**

Scholarly Impact

- Because so much research is not shared, institutions are not measuring their full impact to scholarly advancement

Grants/Funding

- Similarly, understanding the full outputs/impact of grants is challenging, particularly if results don't get published
- Grant dollars can be more effectively allocated and used if more previous research is liberated, limiting duplication or wasted work
- Grant funding can be more confidently awarded to institutions who are showing the full impact of previous grant awards
- Compliance with grantor sharing requirements is inconsistent and burdensome. ARTiFACTS can make it seamlessly built into the workflow, including owned repositories (ARTiFACT can run your repository and drive usage)

Reputation

- Adopting ARTiFACTS signals the institution's commitment to building the reputations of its researchers in real time and supporting the sharing and collaborating of in-process research
- By considering a more comprehensive profile of scholarly achievement, tenure, promotion and funding decisions are more informed

THIS NEW VIEW HIGHLIGHTS THE INHERENTLY RELEVANT & DISTINCTIVELY COMPELLING APPLICABILITY OF ARTIFACTS' BLOCKCHAIN DEPLOYMENT

- **Increased transparency, security and distributed control** are inherent benefits that the scientific community gains with DLT
- **ARTiFACTS seamless blockchain** deployment in the workflow creates a **more effective, immutable and efficient** way for establishing proof of existence (POE) and provenance
- **Blockchain provides an inherently transparent and persistent link** to the citation and the citation chain
  - Authors and all other participants have an unbreakable chain to what a work is citing and what is citing a work
  - Citation counts are consistent and, through the distributed ledger model, balances are in-sync
- **Blockchain can help fix a broken currency*** and, at scale, **creates a transparent 'ledger of record' for research, where everyone can see and agree the balances**
- By making blockchain enabled POE **easy**, the ARTiFACTS' deployment makes **sharing and discoverability** at all stages of research across all forms of content **more secure**, thereby **reducing risk in losing IP control,** and **beneficial** with **ability to 'pay' and receive full attribution at any time**
- Blockchain allows for **information rich citations** (e.g. why a prior work is cited) which can't be done in today's binary system
- **Blockchain is fully compatible with today's workflow**, but can also provide potentially transformative extensions into peer review, funding administration, and digital works rights and access management