

London, 5 Dec 2022, back together after 2 years of lockdowns!



At The Stables at Springer Nature, with 27 peers

Brainstorm using the Delphi method



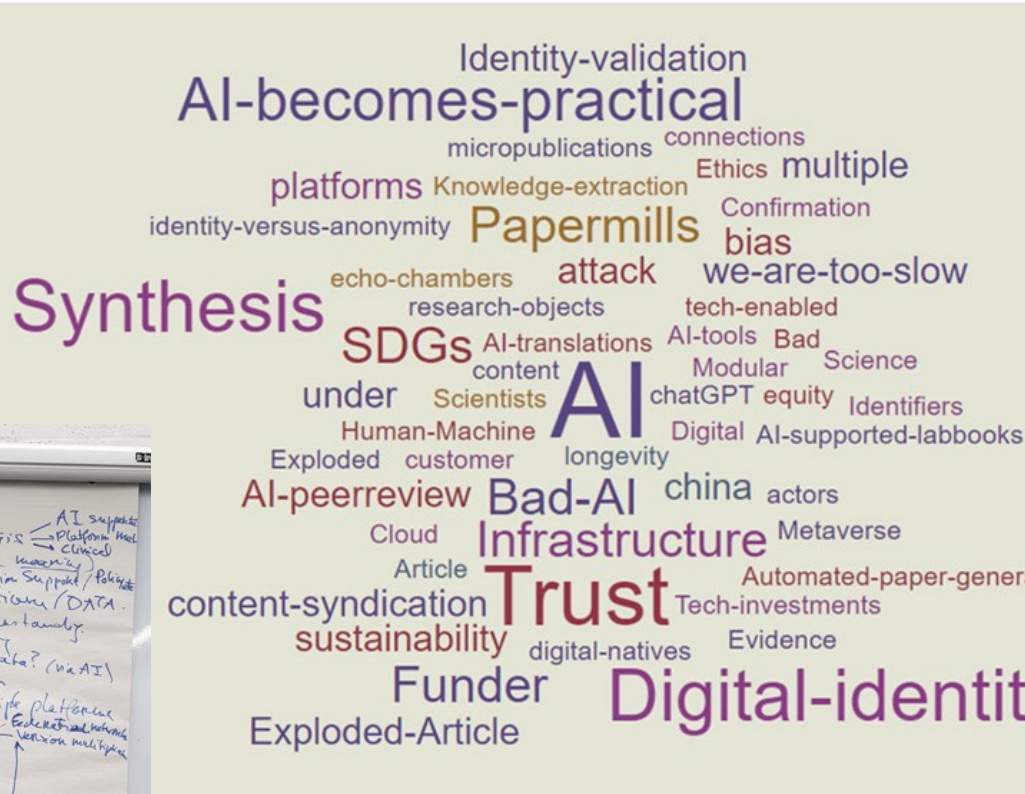
- December 2022: STM Future Lab Brainstorm Meeting
- Using the Delphi Method for Technology Forecasting
- This year: 27 participants from STM member organisations
- Members from STM's STEC and FutureLab committees
- Mostly senior staff in: Innovations, Technology, Strategy, Business development, Platforms, IT



Key elements in the discussion

⊕ AI → more tools for All.
 → translators
 supporting researchers
 AT SCALE → peer review
 → reader.
 Evidence (w/ DATA)
 ⊕ Funder Involvement
 Cloud Infrastructure
 Infrastructure → PID's
 ⊕ Research Assessment (science, medicine, research)
 Tired Class Research Objects
 Human Machine Interaction
 ⊕ Over-reliance on AI?
 Confirmation bias.
 Digital loops

⊕ Content Synthesis → AI supported
 Missing info? (make research)
 ⊕ Customer connections (DATA)
 → data, understanding
 Convergence Text & Data? (w/ AI)
 ⊕ Content Syndication
 CHINA
 Distributed content
 Author competition
 Open content → books, journals
 Collaboration → for data, micro pub, Exploded Article
 Infrastructure → papers, preprint, JAR's
 → too slow?
 ⊕ Sustainability → impact on travel, energy
 → Funder shifts as industry
 → Digital Sustainability
 Pace of innovation in software (micro services)



Automated paper generation from lab-books GPs
 ⊕ AI for the bad (Paper Mills)
 + Danger of Algorithms, echo-chamber
 + Persistence + Discrepancy
 ⊕ Trust across ALL - identifiers
 → Conservatism threat + Too slow
 Cybercrime.
 ⊕ Digital Identity
 Human Identity in Technology
 Equity enabled by Tech.
 Check Ethics Integrity (Chicago)
 Metaverse + Fair value.
 End of Modularity → make mod.
 Knowledge Science and Tech in

From How-to to Why? Purpose
 Problems to solve
 How to use the content
 What is in the content.
 ⊕ AI → not just us (+ bad actors)
 → who else uses it.
 → what environment to create.
 Who controls trust?
 From what to why ← Humans + Ethics.
 Identity versus Anonymity.
 Other parties out there → faster!

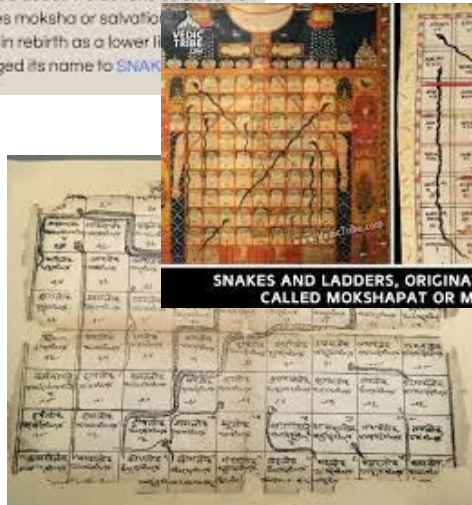
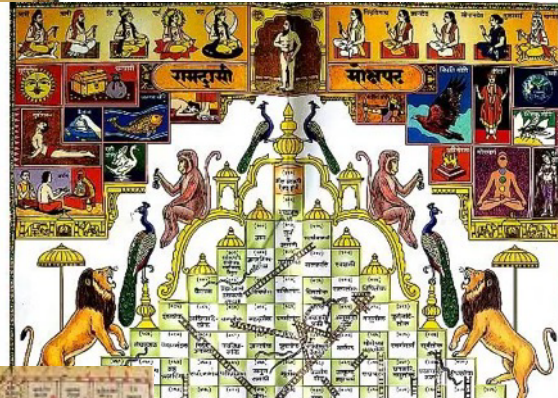
About the boardgame 'Snakes & Ladders'

Snakes and Ladders is an ancient game from India, more than 2000 years old, invented to teach children about virtues and vices, destiny and desire, good and bad karma. All the good deeds we do, take us closer to the top (ladders), whereas evil makes us slip downwards (snakes, leading us to lower levels for rebirth). Original name: Moksha Patam.

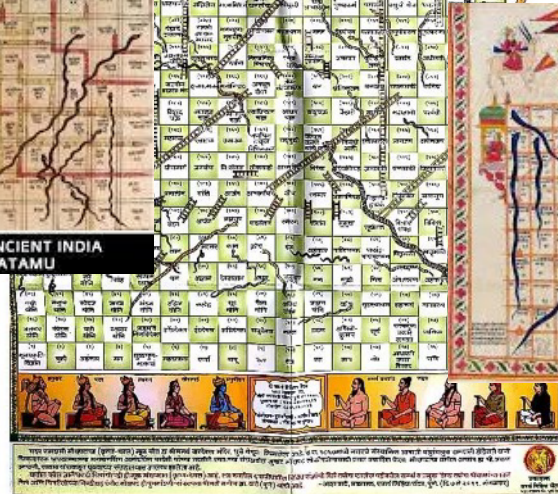
MOKSHA PATAM



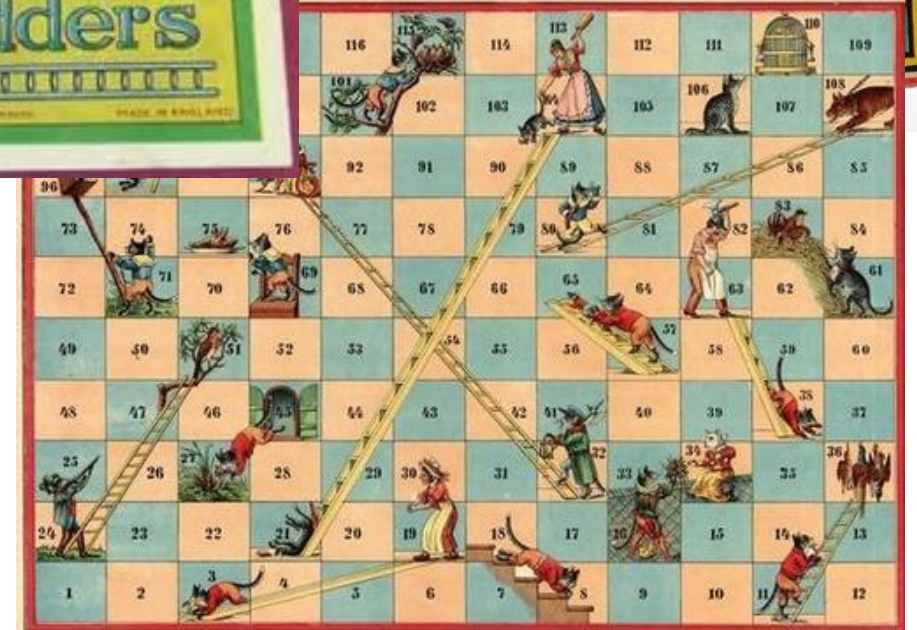
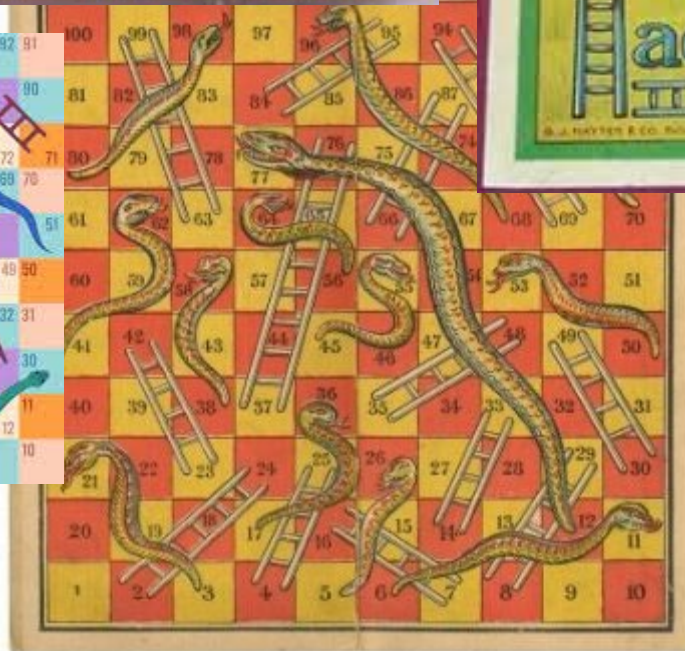
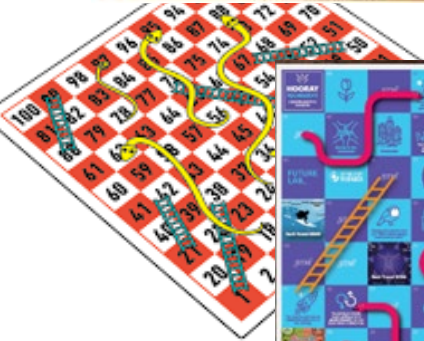
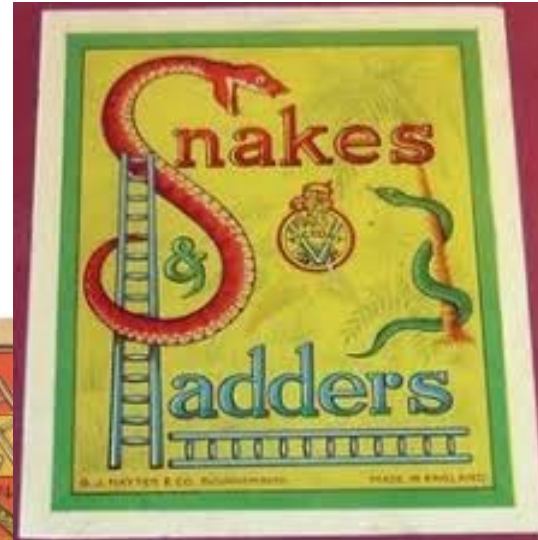
In ancient India, this game originated as **MOKSHAPAT OR MOKSHA PATAMU**. The game was apparently invented to teach children a lesson in morality, about karma and kama (destiny and desire). The ladders signify **Good deeds** while the snakes represent all the **Evil we do**. All the good deeds we do take us closer to 100, which symbolises moksha or salvation. All the evil we do results in rebirth as a lower life. The Britishers later changed its name to **SNAKES AND LADDERS**.



SNAKES AND LADDERS, ORIGINATED IN ANCIENT INDIA CALLED MOKSHAPAT OR MOKSHA PATAMU



Since the mid-19th century, a popular children's game around the world



6 key areas with new complexities, hurdles and rewards



ARTIFICIAL INTELLIGENCE

How to detect what comes from a machine or from a genuine human hand and mind? Machines can develop hypotheses from lab notebooks, unearth new medical treatments, carry out research and even write papers and peer review reports.



OPEN RESEARCH

Trusted Research is transparent and open research, reproducible and replicable. Share, link and cite Research Data and all other outputs, with richer metrics for improved reproducibility and more equitable assessment. Will platform plurality and content syndication make sharing the VoR easy ... or unwieldy?



DIGITAL IDENTITY

On the web anything is trackable and traceable. Identity, authenticity, and provenance need to be checked for trust; usage data can translate into a more personalized experience and higher efficiency. We also need data privacy and security, as researchers may want to search and read without being tracked.



COLLABORATION

Scholarly Communications has many different stakeholders, from funders, researchers, their institutes, to publishers, readers, libraries and repositories. And all who work with the outcomes: practitioners, doctors, engineers, teachers, citizens and so forth. Cross-stakeholder global collaboration will help to develop more robust and efficient solutions.



SOCIAL RESPONSIBILITY

Clear communication of trusted knowledge and new insights contributes to the world's well-being. The UN SDGs declare our shared responsibility for mitigating climate change, promoting equality and health, and pledging more Diversity, Equity and Inclusion.



RESEARCH INTEGRITY

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LEVEL UP!

Master the new complexities. Go for the top.

This year's edition of the STM Trends is symbolized by the board game Snakes & Ladders, a children's game originally from India and more than 2000 years old. It expresses how life is a combination of upward potential (climbing ladders) and downward risks (sliding down snakes). This duality exists in everything. Play the game to sharpen your thinking about the new complexities in Scholarly Communications, your journey amidst those complexities, and the role you can play in shaping its future.

This STM Trends edition identifies six key areas in which new levels of complexity are expected in the next four to five years. Climb its ladders to learn how the future of Scholarly Communications is full of potential for all its stakeholders. Avoid the snakes and be mindful of new risks, while you create your path towards a common goal of **Advancing Trusted Research**.

Reach for the top as you explore these six impactful areas for the next few years:

Key areas

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Advancing Trusted Research

PLAYER PAWNS

The playing field of Scholarly Communications has many different types of players. Try to include them all in the game. Work together. Cross-stakeholder collaboration is an essential element in our activities.

Artificial Intelligence is the most central area on the board

How to detect what comes from a machine or from a genuine human hand and mind? Practical AI may turn scholarly comms on its head. Machines can develop hypotheses from lab notebooks, unearth new medical treatments, carry out research and even write papers. High quality, machine-readable content feeds AI tools that aim for better, unbiased results

84
Paper mills attack! 60 fake articles in your favourite journal

75
Caution! This article was written by ChatGPT

66
SCHOLI%

55
+3 POINTS
AI supports faster peer review

57
-2 POINTS
This content is not machine readable

56
+3 POINTS
AI speeds up medical research

55
+3 POINTS
AI supports faster peer review

54
doi

44
+3 POINTS
AI generates new research hypotheses for a cure for cancer

45
ARTIFICIAL INTELLIGENCE

47
-2 POINTS
The concept of authorship gets FUZZY

37
-2 POINTS
Paper Mills use AI to fabricate fake science

34
+3 POINTS
You are transparent about your AI ethics principles

24
International Science Council

25
-2 POINTS
Image manipulation driven by AI

26
-2 POINTS
FAKE!
These data were fabricated by an AI

27
ST

Directly related: Digital Identity

On the web everything is trackable and traceable. Identity, authenticity and provenance need to be checked for trust; usage data facilitates personalized efficiency.

Persistent identifiers are essential, for people, organisations, and all (new) types of research output.

We also need data privacy and security, as people may value anonymity when they carry out research.





The game starts at Social Responsibility

Science and research bring progress in society.

Clear and effective communication of trusted knowledge and new insights contributes to the world's well-being.

The United Nations' Sustainable Development Goals declare our shared responsibility for mitigating climate change, promoting equality, health and pledging more Diversity, Equity and Inclusion.

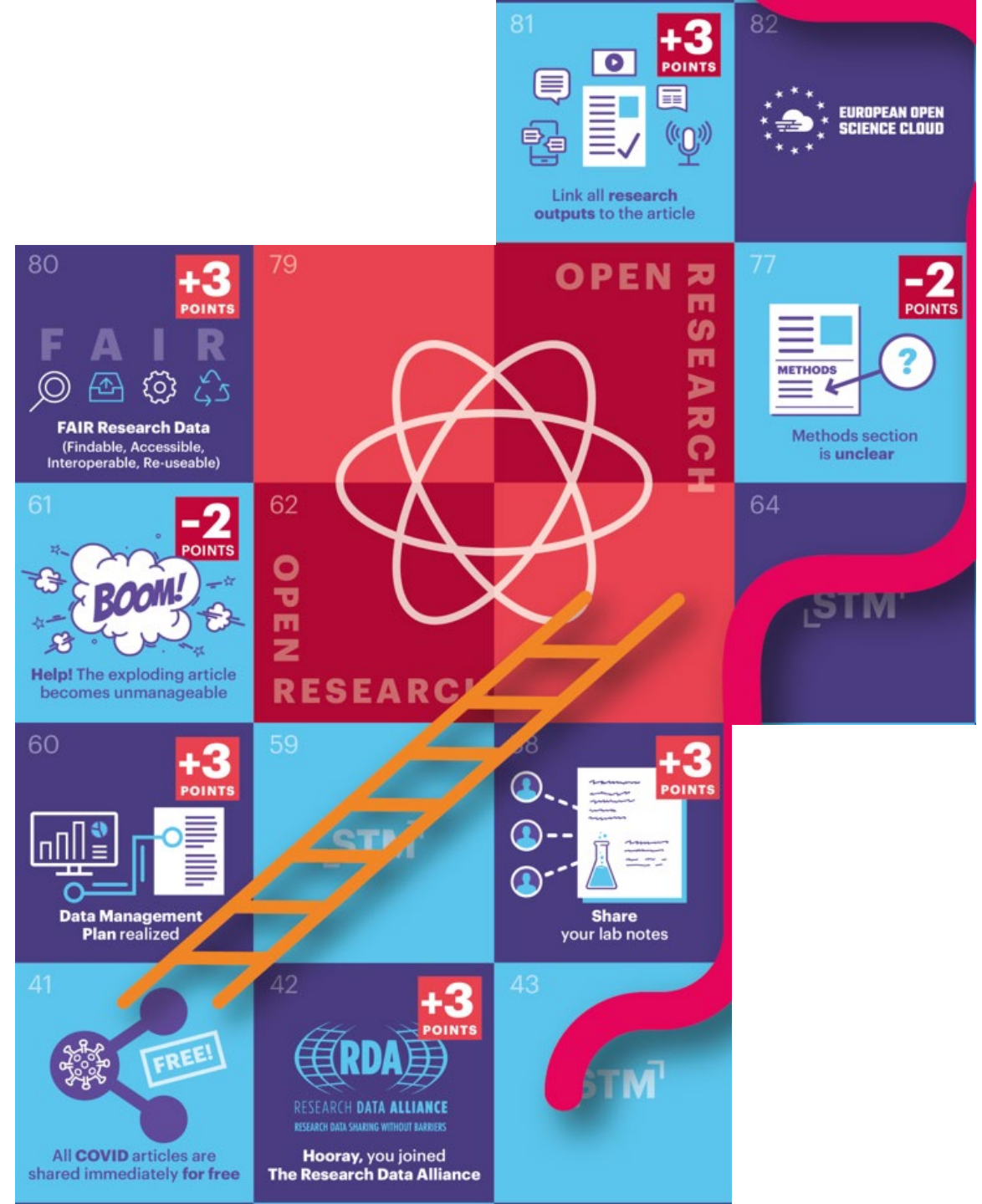
The importance of Open Research

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Who stewards the version of record and how to manage its corrections, additions and/or retractions?

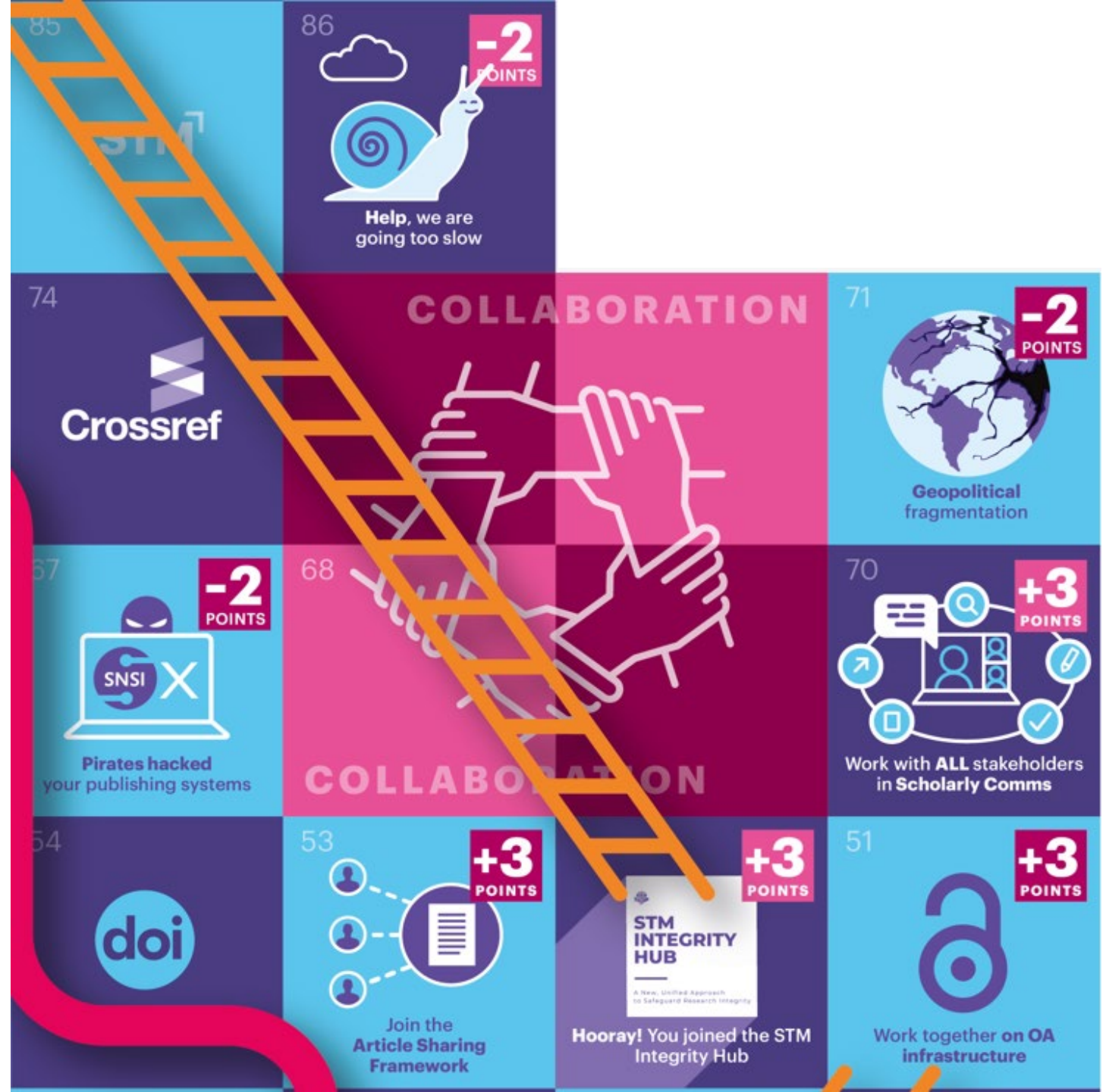


We need to Collaborate!

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Cross stakeholder global collaboration, will help to develop more robust and efficient solutions.

Publishers can work together on better solutions and common infrastructure.



Our ultimate aim is Research Integrity

Science is under attack; via fake papers from Paper Mills and perverse pressure from legacy reward systems. AI in the hands of bad actors and fake digital identities on the web place trust and integrity in jeopardy.

Publishers have a key role in securing Trust and Integrity in research.

Collaborative action throughout the scholarly communication chain is essential to *Advance Trusted Research*.

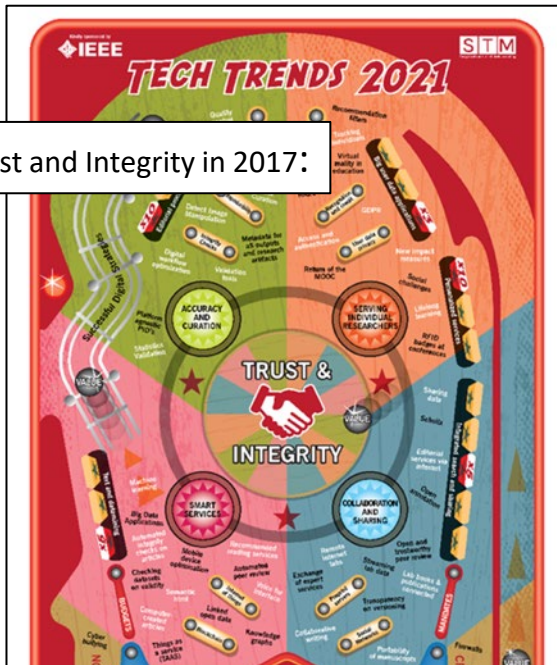


Look how past Trends Editions carried these 6 themes

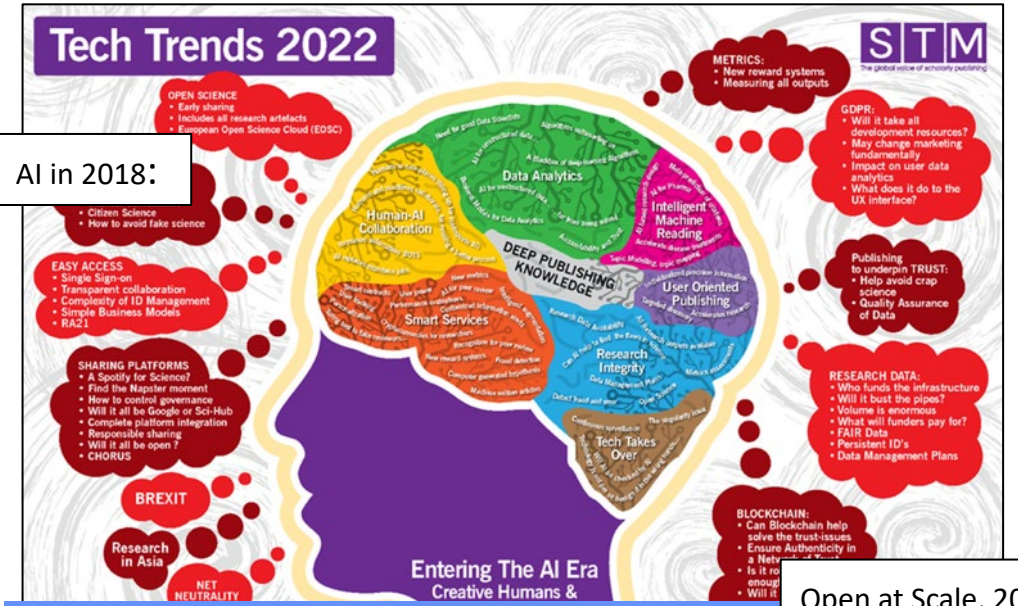
Open Data in 2015:



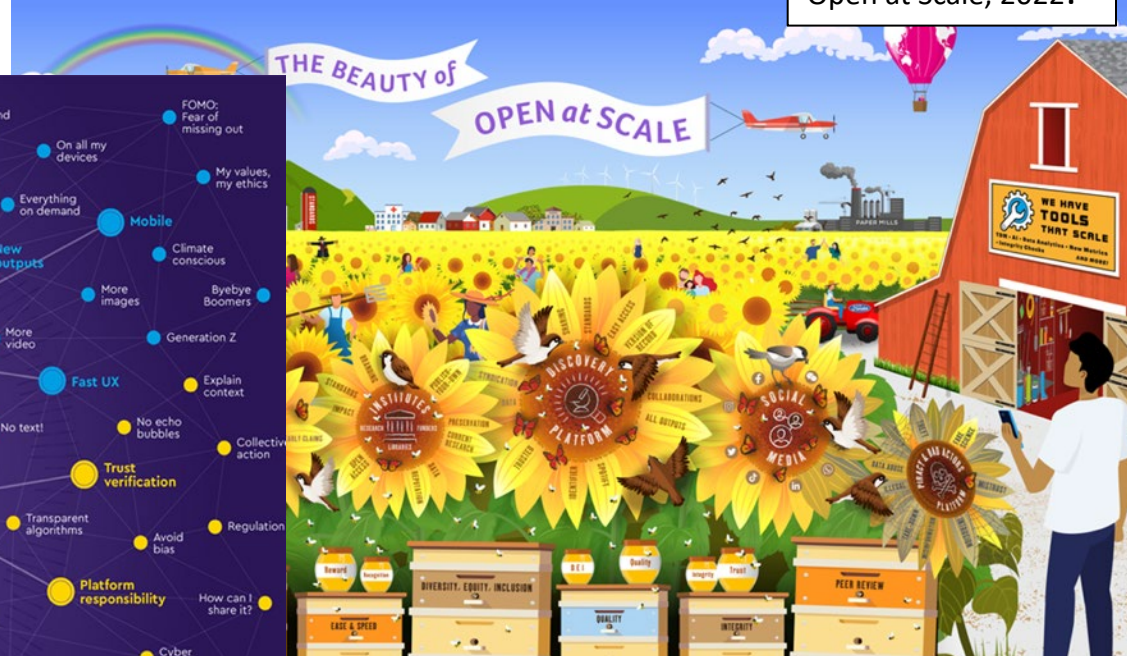
Trust and Integrity in 2017:



AI in 2018:



Open at Scale, 2022:



Collaboration in 2019:



Digital Identity in 2020:



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Advancing Trusted Research

93 Problem journals are dangerous

92 Caution! Citation rings suspected

81 Link all research reports to the article

79 FAIR Research Data (Findable, Accessible, Interoperable, Reusable)

61 Help! The exploding article becomes unmanageable

60 Data Management Plan required

41 All COVID articles are shared immediately for free

40 Support scientists in war zones

21 Achieve Diversity and Inclusion

94 STM

95 RESEARCH INTEGRITY

82 No transparent about selections

80 EMERGE OPEN SCIENCE CLASS

77 Methods section is unclear

64 AI generates new research hypotheses for a cure for cancer

44 AI generates new research hypotheses for a cure for cancer

43 STM

39 STM

38 STM

37 STM

24 International Science Council

18 research4life

17 Hoarey, you joined Research & Life

16 This journal has no women on its board

15 IFLA

14 NISO

13 STM

12 STM

11 STM

10 STM

87 COPE

86 Science is under attack!

84 Paper mills attack! 60 fake articles in your favourite journal

75 Caution! This article was written by ChatGPT

74 Crossref

68 Phases hacked your publishing systems

66 COS SCHOLIX

56 AI speeds up medical research

55 AI speeds up medical research

54 AI speeds up medical research

53 AI speeds up medical research

47 The concept of authorship gets POZZY

46 CHORUS

34 You are transparent about your AI ethics principles

33 GET FULLTEXT RESEARCH

32 How smart? You connect all articles to ORCID

31 This author does not exist

26 Seamless Access.org

25 Hoarey, you joined SeamlessAccess.org

19 Big Tech surveillance! They can track and track everything

18 STM

17 STM

16 STM

15 STM

14 STM

13 STM

12 STM

11 STM

10 STM

98 Duplicate submissions overstress peer review

87 You apply Transparent Peer Review

86 Help, we are going too slow

71 Disruptive Representation

70 Work with ALL stakeholders in Scholarly Comms

69 Join the Article Sharing Framework

68 Hoarey! You joined the STM Integrity Hub

67 Work together on OA Infrastructure

66 PIDs on everything

51 PIDs on everything

49 PIDs on everything

48 PIDs on everything

47 PIDs on everything

46 PIDs on everything

45 PIDs on everything

44 PIDs on everything

43 PIDs on everything

42 PIDs on everything

41 PIDs on everything

40 PIDs on everything

39 PIDs on everything

38 PIDs on everything

37 PIDs on everything

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11 PIDs on everything

10 PIDs on everything

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RULES OF THE GAME

STM

- 1/ Each player chooses which pawns to play with. A player may have no more than 3 pawns.
- 2/ All pawns are placed on the starting square at the beginning of the game. Pawns travel across the board following the sequence of numbered squares.
- 3/ Each player throws the dice in turn, and moves forward with one of their pawns by the number of squares shown on the dice.
- 4/ If a pawn arrives at the bottom of a ladder on the last square of its move, it may climb the ladder to its top.
- 5/ If a pawn lands on the head of a snake, the pawn must slide down to the base of the snake, and remain in that position until the next turn.
- 6/ If a pawn arrives at a square with bonus points, these should be added to the player's score.
- 7/ If a pawn arrives at a square with penalty points, these should be deducted from the player's score.
- 8/ A pawn must arrive exactly on square 100 to finish. If the dice indicates a higher number, the pawn must retrace its steps using the remaining moves.
- 9/ A player collects their bonus points when their pawn lands correctly on the final square 100.
 - a. The very first pawn to arrive collects 3 extra points for every pawn from fellow players still out on the board.
 - b. The second pawn to arrive collects 2 extra points for every other pawn from fellow players still out on the board.
 - c. Thereafter every pawn to arrive collects 1 extra point for every other pawn from fellow players still out on the board.
 - d. The very last pawn arriving collects no extra points.
- 10/ The game is finished when the last pawn on the board lands on square 100.
- 11/ The winner of the game is the player who has the highest number of points on their score card.
- 12/ **Optional extra:** when a pawn arrives on any of the 4 coloured squares of the 6 key areas, take 5 minutes for a group discussion: Discuss with your fellow players new initiatives for this particular area.

The Game Play

Each player can play with more than one pawn and can choose which one to move forward, after throwing the dice, in order to benefit best from ladders and to avoid snakes as much as possible.

We want everyone to reach the top and arrive at the finish. Some go faster than others and win bonus points for that.

Others may go slower in the field; everyone can gather bonus points during their journey. Or lose points by landing on squares with penalty points.

The game is intended to be a conversation starter; if a player lands on the core of one of the 6 key areas, take some time to start a discussion with fellow players about that topic.

It is a multi-stakeholder playing field, where collaboration counts!



A multi-stakeholder playing field

The playing field of Scholarly Communications has many different types of players. Try to include them all in the game. Work together. Cross-stakeholder collaboration is an essential element in our activities.



Enter the playing field yourself!

- **STM Trends 2027 poster** is available on the STM website: <https://www.stm-assoc.org/trends2027>
- For downloading and printing (best on A2)
- You can also download the board game and the player pawns and sample scorecards for printing
- Start playing with your colleagues: Go for the top!
- Video recordings of previous presentations are available on the STM website

Also available (book now): In-house presentations, either by Zoom or in-person

