

The impact of digital transformation on the practice of fire investigation

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DBI 2019 Fire Investigation Scientific Days

Digital transformation

« Digital transformation concerns the global accelerated process of technical adaptation by individuals, businesses, societies and nations, which comes as a result of digitalisation »

Khan, S. (2016). Leadership in the digital age: A study on the effects of digitalisation on top management leadership.



The impact of societal change

«The materials that make up the bulk of the fuels involved in most structure fires have changes dramatically over the last 30 or 40 years, affecting the way in which fires ignite and spread, the combustion products they create, the heat release rates and temperatures they produce and the residues they leave behind.»

«The intensity of such fires can obliterate traces of ignition sources, induce the speed of spread and kind of damage once thought possible only for accelerated fires, and make the recovery and identification of possible accelerant traces very difficult.»



DeHaan J., 2002, "Our Changing World", Fire & Arson Investigator, 44-45.

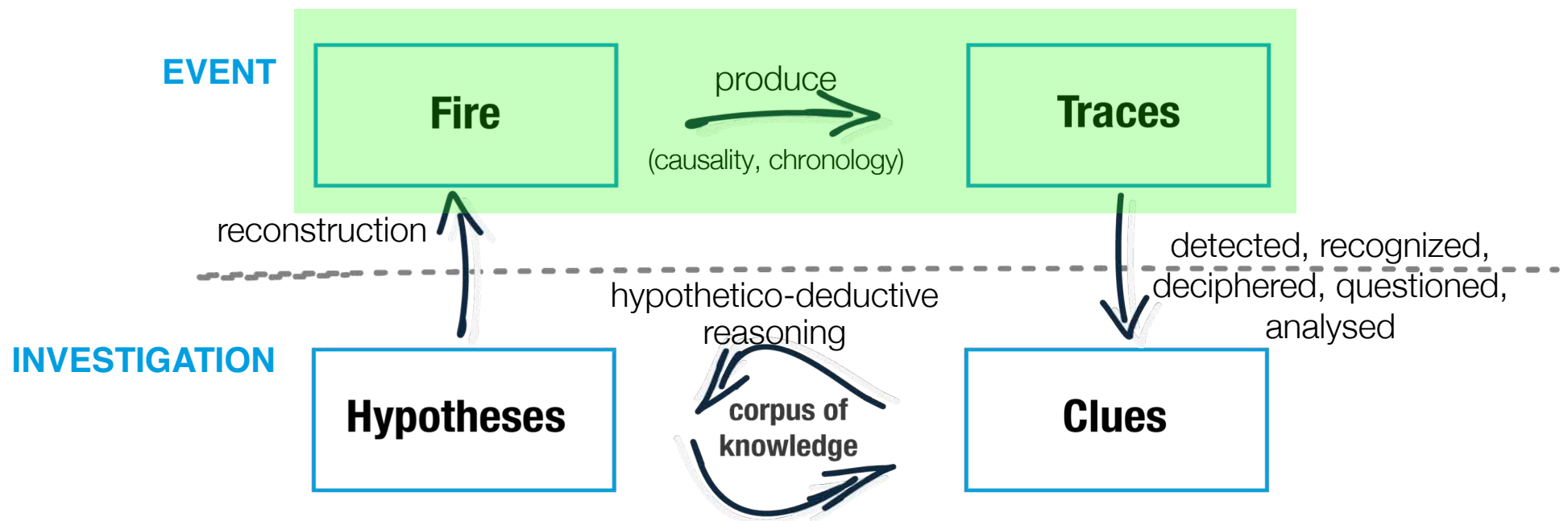
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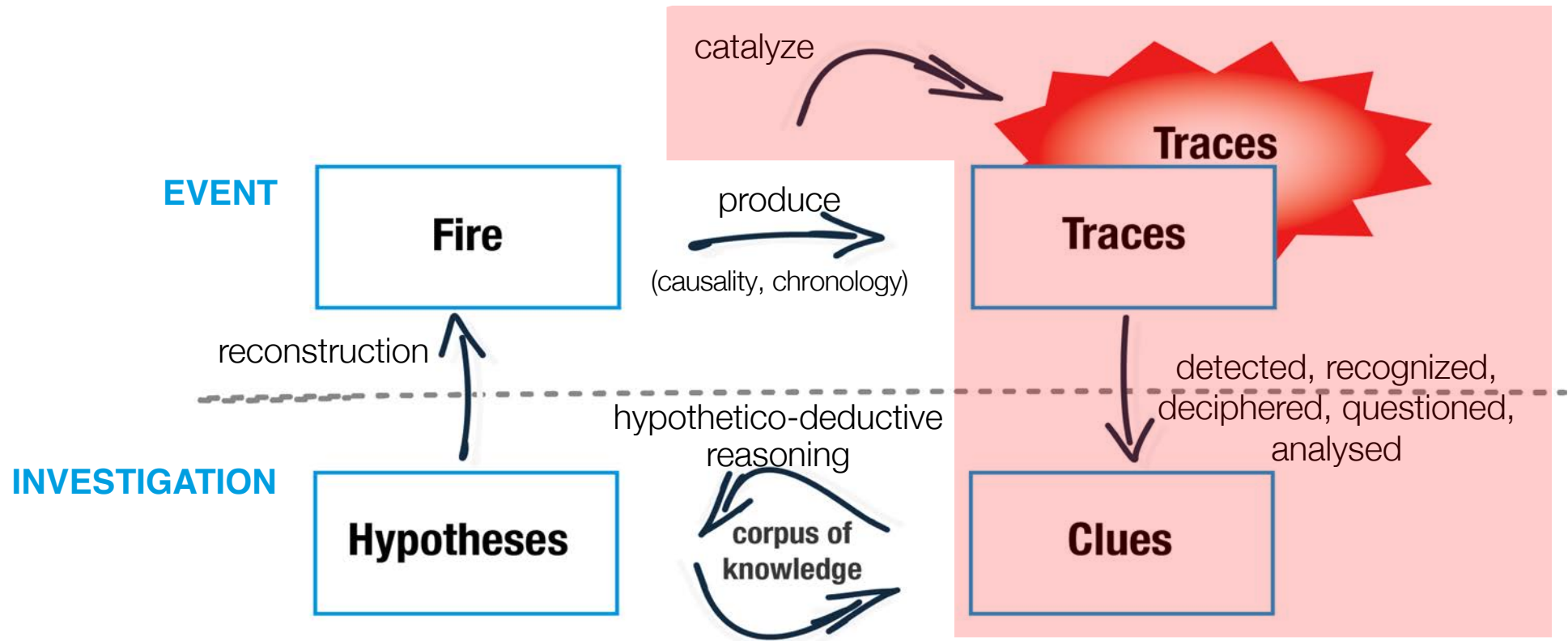
The impact of societal change

- > Fire investigation is the practice of forensic science in a typology of events, relying on the use of (imperfect) remnants of the past – traces (evidence) – to reconstruct the event in conjunction with any other valuable information



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The impact of societal change

- > Digital transformation
 - > leads to a gradual adaptation of our habits and behaviours
 - > involves **new actions**, **new opportunities** and a **new traceability** of events
 - > is underway, and its effects are already being felt in our daily lives...
... let's take the example of images



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Impact of the digital transformation

- > Proliferation of image capture and image diffusion
 - > Smartphones, iPads, digital cameras, surveillance cameras, on-board and body-worn cameras, GoPro,...
- > Massive (unprecedented in order of magnitude !) production of images that create a new information environment



Source : OmnicoreAgency.com

Number of Photos shared to date: 50 billion + (17.09.2018)

Number of Photos & Videos uploaded per day: 100 million+ (18.07.2018)

- > Moreover, “extraordinary” events catalyze the production of images

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Postulate resulting from the digital transformation

Any unusual event taking place in a busy place is necessarily photographed or filmed

➔ images as forensic traces

wide variety of formats (photos, video, ...) and sources

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The rise of images as forensic traces feeding fire investigation

Once **collected**, **sorted**, **organized** and **combined**, these images are decisive data for the reconstruction of the event

Location of fire origin, chronological sequence of events, nature of fire spread, contextualization of witness statements, configuration of the places before/during the event,...



Digital transformation is changing the game...

- > It is capital to recognize the cornerstone contribution of images in fire investigation
- > This begins by considering them fully **as forensic traces**, not as tactical information

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The rise of images as forensic traces feeding fire investigation

- > As forensic traces, images must be:
 - > detected, recognized, and above all systematically **searched**
 - > suitably **collected**, ensuring the preservation of information integrity
 - > **analysed**, i.e. deciphering the information they convey
 - > **used** in combination with all other traces («scientific method»)

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The need for a method

- > More often than not, pertinent images are not directly available
- > They have to be searched, proactively and systematically

Extension of the scene of investigation

- > **Searching strategies** – relevant, systematic, efficient, effective – have to be developed
- > Viable route: progressive approach
 - > Intelligence-led search : based on emergency call list ...
 - > Progressive enlargement : « call for witness », on-site drop box, OSINT ...

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The need for a method

- > The constraints for preservation of the integrity of the information have to be understood and acknowledged

 Collection procedures avoiding contamination

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The need for a method

- > Just as has happened with other types of investigations, **new investigation schemes** must be developed



The need for a method

- > Just as has happened with other types of investigations, new investigation schemes must be developed
 - ➔ the fire investigation practice must take advantage of the changes induced by the digital transformation

**Digital traces – especially images –
may become the **main traces**
supporting fire investigation**

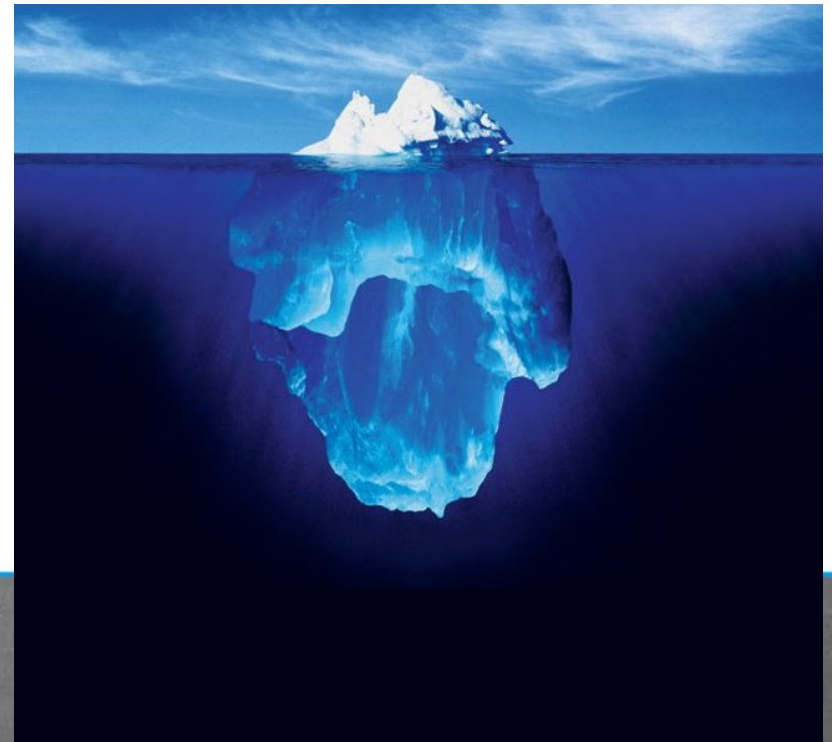
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Digital transformation: the future is yet to be invented

- > Fire is an « extraordinary » event: it disturbs and affects the environment where it takes place
 - > **Traces** : modifications, perturbations
- > Images are a concrete example of this. But other **digital data** (yet to be “invented”) will undoubtedly become **useful traces** for the reconstruction of events: digitization, home automation, robotization, IoT...



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