**Collaborative Discussion 1**

‘System failure is a system that fails to develop or does so in a stunted fashion’ (Carlsson and Jacobsson ,1997 in Bergek et al., 2008).   The first six months of 2018, the national IT systems across the NHS in Wales experienced such system failures as a total of 21 outages took place resulting in various disruptions for GPs, health care staff and patients (Postelnicu, 2018).

These IT system failures in the Welsh NHS affected appointments, prescriptions and in general the health care provision as the professionals were unable to access electronic patients records for several hours (Donnely, 2018).   Moreover, patients could not book or re-book or cancel their appointments, nor be given test results, whereas GPs could not have access to blood and X-Ray results (BBC, 2018).  Dr Peter Saul, of the Royal College of GPs in Wales, said: "Today, IT systems are as critical to clinicians as stethoscopes and scanners. Data outages can be extraordinarily disruptive for practices and for patients’ (Geraint, 2018).

As Schwab (2016) pointed out the Fourth Industrial Revolution, we are now experiencing, is a distinct one compared to the previous as for three components: velocity, scope, and systems impact.  System interdependencies can result in disrupting daily life and industries in every country.  On top of that, there may be a widespread feeling among the population that the extensive availability and circulation of high volumes of both structured and unstructured data has a negative impact on our inner lives and therefore we may lose control over them.

By interdependency is meant ‘a bidirectional relationship between two infrastructures through which the state of each infrastructure influences or is correlated to the state of the other’.  This is why, ‘[…] identifying, understanding, and analysing such interdependencies are significant challenges’, exacerbated by the breadth and complexity of critical IT nationwide infrastructures (Rinaldi et al., 2001).

The Welsh NHS IT system failures had to do with infrastructures which share cyber interdependency (Rinaldi et al., 2001), meaning that their state depends on information transmitted through the information infrastructure.  Eventually, such weaknesses in system structure may lead to interaction failures (related to networks) and to institutional failures (related to institutions) as it was the case of the Welsh NHS outages and may have an impact on the public trust towards state actors and operators.

Realising to what extent governments and public or private databases are vulnerable to failures or to external threats is crucial for how public policies will take shape and public goods will be delivered to citizens in the future.  Concerns about the vulnerability may even make countries roll back their initial plans for full replacement of the physical dimension into the digital one.  ‘Sweden and Norway are backpedalling on plans for cashless societies over fears that fully digital payment systems would leave them vulnerable to Russian security threats, and concern for those unable to use them.  Prolonged power cuts, system failures or digital attacks on payment systems and banks could leave cash as the only alternative that is easily available’ (Bryant, 2024).

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