

The Tragedy of the Attentional Commons – In Search of Social Rules for an Increasingly Fragmented Space

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Abstract

The majority of the workforce in the developed world consists of knowledge workers who are confronted with computers in between them. The problem of degradation of the knowledge worker is briefly reviewed, before focus is given to the attention economy as a relevant context for the issue of degradation. The notion ‘attention space’ is introduced and as part of the attention space the ‘attentional commons’ is identified. Based on economic analysis, it is derived that the attentional commons shows properties which are typical for the rise of the so called ‘tragedy of the commons’. The degradation of the knowledge worker is identified as the actual tragedy of the attentional commons. Potential avenues leading to a solution of the tragedy in form of market-, norms- and organization-based approaches are discussed.

Keywords: tragedy of the commons, attention economy, externalities, spatial turn, knowledge worker.

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Introduction

The achievements of the modern business world very much rest on the shoulders of people who since Peter Drucker introduced the term in 1959 have been called knowledge workers. In the industrialized parts of the world, the share of knowledge workers steadily rises and they represent the majority of the workforce.¹ A typical knowledge worker today interfaces with other actors in at least several of the following ways: the office/meeting room, desk phone, mobile phone, email client, instant messaging client, computing devices with Internet browser and Apps including but not being limited to search engines, social media networks, RSS feeds, Wikipedia,

YouTube and Skype. In this context, one can say that “...knowledge workers are engaged in the production, process, or distribution of information.”²

Organizations who employ these knowledge workers claim that people are their most important asset. They need them to produce, process and distribute information in the most effective and efficient ways. This is supposed to be achieved with technological support and as Hal Varian claims: “Due to the dramatic cost decrease in computers and communication, there is now a computer in the middle of virtually every transaction.”³ Initial waves of electronic commerce and electronic business are now followed by what is called the *digital disruption* of

¹ See Wolf, E. (2005): The Growth of Information Workers in the U.S. Economy. In: Communications of the ACM 48 (10), 37–42. Apte, U.; Nath, H. (2004): Size, structure and growth of the U.S. economy. Center for Management in the Information Economy (Ed.), Business and Information Technologies Project (BIT) (Working Paper).

² Karr-Wisniewski, P.; Lu, Y. (2010): When more is too much: Operationalizing technology overload and exploring its impact on knowledge worker productivity. In: Computers in Human Behavior (26), 1061–1072.

³ Varian, H. (2014): Beyond Big Data. In: Bus Econ 49 (1), 27–31.

almost every industry.⁴ However, it is not the technological change as such but rather the change of social processes which appear to matter.⁵ Whilst companies seek to gain competitive advantage in this era of fast paced change, their knowledge workers find it increasingly difficult to cope with their working environment.⁶ As will be shown below, they lose attention.

It is at this point, where this paper pays attention and presents itself in the following structure: First, the problem of degradation of the knowledge worker is briefly reviewed. Second, focus is given to the attention economy as a relevant context for the issue of degradation and notion 'attention space' is introduced. As part of the attention space the 'attentional commons' is identified. Third, it is derived that the attentional commons shows properties which are typical for the rise of the so called 'tragedy of the commons', a phenomenon that has intensively been studied by social scientists. The degradation of the knowledge worker is identified as the actual tragedy of the attentional commons. Fourth, potential avenues to a solution of the tragedy of the attentional commons in form of market-, norms- and organization-based approaches are discussed before the paper is concluded.

Related work has been conducted in various fields. The effects of information technology on knowledge workers have widely been studied for many years, for example with a recent focus on email overload.⁷ This links into research on connectivity choices and how they affect personal and social

outcomes.⁸ At the same time, the attention economy is an object of study and attention economics is in the process of becoming a dedicated discipline.⁹ Also, the digital commons has been studied.¹⁰ However, there is some way to go in academia and practice for the topics and the issues involved to be interrelated for the benefit of the individual and for the organizations concerned.

The Problem of Degradation

Inspired by Schirmacher, who describes the experience of permanent ungraceful degradation of brains in relation to the existing information flood, degradation can be observed to take place when humans interact with other humans and with machines.¹¹ This process of degradation is largely fueled by the human actors themselves: Human beings are keen to interact via information technology. They cannot wait to respond to new electronic messages.¹² They increasingly and

⁸ See Kolb, D.; Caza, A.; Collins, P. (2012): States of Connectivity: New Questions and New Directions. In: *Organization Studies* 33 (2), 267–273.

MacCormick, J.; Dery, K.; Kolb, D. (2012): Engaged or just connected? Smartphones and employee engagement. In: *Organizational Dynamics* 41 (3), 194–201.

Dery, K.; Kolb, D.; MacCormick, J. (2014): Working with connective flow: how smartphone use is evolving in practice. In: *Eur J Inf Syst* 23 (5), 558–570.

⁹ See Davenport, T.; Beck, J. (2001): *The attention economy. Understanding the new currency of business*. Boston: Harvard Business School Press. Festré, A., Garrouste, P. (2012): *The 'Economics of Attention': A New Avenue of Research in Cognitive Economics*. In: Egidi, M., Rizzello, S. (Ed.): *Handbook of Cognitive Economics*. Cheltenham: Edward Elgar. Falkinger, J. (2007): Attention economies. In: *Journal of Economic Theory* 133 (1), 266–294.

Falkinger, J. (2008): Limited Attention as a Scarce Resource in Information-Rich Economies*. In: *The Economic Journal* 118 (532), S. 1596–1620. Ocasio, W. (1997): Towards an Attention Based View of the Firm. In: *Strategic Management Journal* 18 (Summer Special Issue), 187–206.

¹⁰ See Greco, G.; Floridi, L. (2004): The tragedy of the digital commons. In: *Ethics and Information Technology* 6 (2), S. 73–81. Huberman, B.; Lukose, R. (1997): Social Dilemmas and Internet Congestion. In: *Science* 277 (5325), 535–537.

¹¹ See Schirmacher, F. (2009): *Payback. Warum wir im Informationszeitalter gezwungen sind, zu tun, was wir nicht tun wollen, und wie wir die Kontrolle über unser Denken zurückgewinnen*. 1. Aufl. München: Blessing. 13.

¹² See Alberts, I. (2013): *Challenges of Information System Use by Knowledge Workers: the Email Productivity Paradox*. ASIST. Montreal, Quebec, 01.11.2013. Deal, J. (2013): *Always On, Never Done? Don't Blame the Smartphone*. Center for Creative Leadership (White Paper).

⁴ McQuivey, J. (2013): *Digital disruption. Unleashing the next wave of innovation*. [Cambridge, Mass.], Las Vegas, NV: Forrester Research, Inc.; Amazon Publishing.

⁵ Beinhocker, E. (2007): *The origin of wealth. The radical remaking of economics and what it means for business and society*. Boston, Mass.: Harvard Business School Press, 261ff.

See also: DeSanctis, G.; Poole, M. (1994): Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory. In: *Organization Science* 5 (2), 121–147.

⁶ See Nink, M. (2015): *Engagement Index Deutschland 2014*, Berlin: Gallup. Towers Watson (2012): *Global Workforce Study 2012*. Towers Watson.

⁷ See Jackson, T.; Dawson, R.; Wilson, D. (2001): The Cost of Email Interruption. In: *Journal of Systems and Information Technology* 5 (1), 81–92. Jackson, T.; Dawson, R.; Wilson, D. (2003): Understanding email interaction increases organizational productivity. In: *Communications of the ACM* Vol. 46 (No. 8), 80–84.



voluntarily feed social media platforms and electronic systems to buy, sell and review goods and services. And they even do this free of charge and call this sharing.¹³ There is something ungraceful about these interactions as the human beings start to degrade. Ungraceful degradation manifests itself in more and more algorithmic behaviours and in loss of attention.¹⁴ This is why degradation is a concept of relevance to management thinkers and practitioners.

Different types of degradation can be distinguished of which two are of particular relevance for the discussion here:¹⁵

Self-degradation: Against their best intentions, knowledge workers negatively impact on their own work and qualification because they interrupt themselves. “The common reaction to the arrival of an email message is not to delay the response to a time that is more convenient to the user but to react with-in six seconds, almost as quickly as they would respond to a telephone call.”¹⁶ People acting in such ways can be described as being in a *semi-sync* mode. Their communication is “not quite synchronous and it’s not really asynchronous communication either.”¹⁷ As a consequence, there is constant interruption.¹⁸ Apart from lost productivity this does also have an impact on the wellbeing of the individuals concerned. The business world experiences an increasing volume

of work related stress from emails.¹⁹ “Continuous partial attention used as our dominant attention mode contributes to a feeling of overwhelm, overstimulation and to a sense of being unfulfilled.”²⁰ This is confirmed by Hallowell who recognizes a neurological phenomenon called attention deficit trait (ADT). “Marked by distractibility, inner frenzy, and impatience, ADT prevents managers from clarifying priorities, making smart decisions, and managing their time. This insidious condition turns otherwise talented performers into harried underachievers. And it’s reaching epidemic proportions.”²¹

Imposed degradation: Quick reactions to emails and comparable communication are not only driven by the recipient itself. There are also the senders who expect quick reactions.²² The majority of interruptions which managers experience are of external nature, whereas other knowledge workers like analysts or developers experience equally frequent occurrences of internal and external interruptions.²³ The intervention from the outside has additional effects resulting in knowledge workers sometimes perceiving to be a *slave* of their messaging system.²⁴ Such a perception arises in an environment where information technology and interaction through machines lowers the threshold for micromanagement, i.e. to “manage with excessive control and attention to detail.”²⁵ Micromanagement is considered to be a form of

¹³ Lanier, J. (2013): Who owns the future? London: Allen Lane, 15.

¹⁴ Lanier, J. (see note 13) 2013), 8 and 15.

¹⁵ For a more detailed review, see Wagner, D. (forthcoming): Graceful Degradation and the Knowledge Worker, in: Küpers, W.; Sonnenburg, S.; Zierold, M. (eds.): Re-Thinking Management, Wiesbaden: Springer VS, forthcoming.

¹⁶ Jackson, T., Dawson, R. and Wilson, D. (2003): Understanding email interaction increases organizational productivity. In: Communications of the ACM Vol. 46 (No. 8), 80–84.

See also: Spira, J.; Feintuch, J. (2005): The Cost of Not Paying Attention: How Interruptions Impact Knowledge Worker Productivity. Basex Inc. New York (Research Report).

¹⁷ Stone, L. (2008): “Continuous Partial Attention” Not the same as Multi-Tasking. Online at <http://s3.amazonaws.com/churchplantmedia-cms/paseodelrey/continuous-partial-attention.pdf>, last checked 01.08.2015.

¹⁸ Based on the behavioural pattern described above, Jackson et al. (see note 16., 83) conclude that up to 96 interruptions may occur during a normal working day. Each interruption requires some recovery time to return the work previously undertaken. In their study Burgess et al. found that email was a problem to 49% of employees as it often distracts them from other aspects of their work. See Burgess, A.; Jackson, T.; Edwards, J. (2005): Email training significantly reduces email defects. In: International Journal of Information Management (25), 71–83.

¹⁹ See Jerejian, A.; Reid, C.; Rees, C. (2013): The contribution of email volume, email management strategies and propensity to worry in predicting email stress among academics. In: Computers in Human Behavior (29), 991–996. Szostek, A. (2011): Dealing with my email: Latent user needs in email management. In: Computers in Human Behaviour (27), 723–729. Venolia, G.; Dabbish, L.; Cadiz, J.; Gupta, A. (2001): Supporting email workflow. Hg. v. Microsoft Research, Collaboration & Multimedia. Online at <http://research.microsoft.com/pubs/69881/tr-2001-88.pdf>, last checked 01.08.2015.

²⁰ Stone, L. (see note 17).

²¹ Hallowell, E. (2005): Overloaded Circuits. Why Smart People Underperform. In: Harvard Business Review (January), 54–62.

²² See Schuldt, B.; Totten, J. (2008): Technological factors & business faculty stress. In: Proceedings of the Academy of Information and Management Sciences 12 (21), 13–18.

²³ See Mark, G.; Gonzalez, V.; Harris, J. (2005): No Task Left Behind? Examining the Nature of Fragmented Work, Portland, Oregon, USA. CHI.

²⁴ See Alberts, I. (see note 12).

²⁵ Merriam-Webster (2014): Micromanage. Online at <http://www.merriam-webster.com/dictionary/micromanage>, last checked 01.08.2015.



mismanagement.²⁶ It may even be considered to be an “endemic corporate sickness.”²⁷ Given that technology provides new, low-cost possibilities to micromanage, it appears to be sensible to identify to what extent these are taken up and to consider the consequences. According to Richard Porterfield symptoms for micromanagement are low motivation, reduced initiative, subdued creativity and finally an immobilization of employees when it comes to decision-making, as decisions are to be made by the superior.²⁸

Whilst subordinates degrade this way, also the respective micromanager suffers, namely from stress caused by the involvement in other people’s jobs.²⁹ Severe micromanagement can be understood to be addictive and classified as a compulsive, behavioural disorder.³⁰ A knowledge worker may not have to fear a compulsive micromanager as his or her superior, yet the consequences of micromanagement are still likely to burdening as micro-information requests from colleagues, customers, suppliers and other business partners cumulate in one’s inbox³¹.³²

Attention Economy and Attention Space

The previous section suggests that the contemporary knowledge worker is in danger of degradation. The quality and the quantity of the work to be done, is under threat, and the person, the human being itself is affected. As and when knowledge workers degrade, their organization is losing their attention. In order

to define what attention is, one can relay to what William James’ said in 1890 in his *Principles of Psychology*:

“Everyone knows what attention is. It is the taking possession by the mind, in clear and vivid form, of one out of what seem several simultaneously possible objects or trains of thought. Focalization, concentration, of consciousness are of its essence. It implies withdrawal from some things in order to deal effectively with others and it is a condition which has a real opposite in the confused, dazed, scatterbrained state which in French is called *distracted* and *Zerstreuung* in German.”³³

As portrayed above, today people may still attend to work as they did prior to digital disruptions but attention becomes more fragmented, distraction spreads and *Zerstreuung* is commonplace. Against this background, it is not surprising that more and more scientists and practitioners claim that we actually live in an “Attention Economy.”³⁴ In an attention economy attention is perceived as a scarce resource. Both, how this resource is supplied and allocated as well as how this resource is in demand, have implications on the economy. In 1969, Herbert Simon was one of the first to note the economic relevance of attention when stating that „a wealth of information creates a poverty of attention.”³⁵

At the outset of further analysis, it is worthwhile to conceptualize the basic building block of today’s attention economy: an individual’s available attention or more specifically here a knowledge worker’s daily attention space.³⁶ A simplified but plausible model may be configured like this: Based on common

²⁶ See Tavanti, M. (2011): *Managing Toxic Leaders: Dysfunctional Patterns in Organizational Leadership and How to Deal with Them*. In: *Human Resource Management (HRM)* (6), 127–136.

²⁷ See Serrat, O. (2010): *The travails of micromanagement*. Asian Development Bank. Washington, DC.

²⁸ See Porterfield, R. (2003): *The Perils of Micromanagement*. In: *Contract Management* (February), 20–23.

²⁹ See Porterfield, R. (see note 28).

³⁰ See White, R. (2010): *The Micromanagement Disease: Symptoms, Diagnosis, and Cure*. In: *Public Personnel Management* 39 (1), 71–76.

³¹ When studying knowledge workers in software development, van Solingen et al. found that the majority of interruptions came from colleagues within the same department / same function. See Solingen, R.; Berghout, E.; van Latum, F. (1998): *Interrupts: just a minute never is*. In: *IEEE Softw.* 15 (5), 97–103.

³² This is particularly relevant, since today many knowledge workers and managers cultivate “substantial consultation of others” before making any decisions which can be a waste of time. See Deal, J. (2015): *Stop wasting your employees time*. In: *Strategy+Business* 78 (Spring).

³³ James, W. (1890): *The principles of psychology*. New York: Holt. S. 403–404. A contemporary definition for the given context is provided by Davenport and Beck: “Attention can be defined as focused mental engagement on a particular item of information. Items come into our awareness, we attend to a particular item, and we decide whether to act” (see note 8). 20.

³⁴ See Davenport, T.; Beck, J. (see note 9).

³⁵ Simon, H. (1969): *Designing Organizations for an Information-Rich World*. Speech - Johns Hopkins University - Brookings Institute Lecture - October 9, 1969. In: D. Lamberton (Hg.): *The economics of communication and information*. Cheltenham, UK, Brookfield, Vt., US: E. Elgar Pub. (The international library of critical writings in economics, 70).

³⁶ Conceptualising attention as a 24 hour space around an individual can be seen to be in the tradition of the literature in the field of the spatial turn within the cultural sciences. See Bachmann-Medick, D. (2006): *Cultural Turns. Neuorientierungen in den Kulturwissenschaften*. Originalausg. Reinbek: Rowohlt Taschenbuch Verlag (Rowohlt’s Enzyklopädie). 288.



empirical data individuals require between six and eight hours of sleep per day.³⁷ On average people in Europe also work a little less than eight hours per working day.³⁸ This leaves them with almost nine hours of leisure time, some of which is to be used to commute to and from work. Figure 1 (1.) serves to illustrate this basic model for what can be called the ‘attention space’ of a knowledge worker. As will be discussed further below, this basic concept does not yet take a phenomenon into account which has been defined as *blurred boundaries* between personal and professional life.³⁹

The attention space of society consists of the sum of the individual attention spaces. The attention space of an organization consists of the relevant shares of the attention spaces of the individuals affiliated with this organization. What happens in the attention space is a result of social relationships within this space and it matters to the individuals involved.⁴⁰ Such a concept emphasizes a conclusion drawn by Thomas Davenport and John Beck who noted that dealing with people’s attention is a zerosum game.⁴¹ Exponentially increasing connectivity and interactivity day in day out continue to meet the same human attention span.

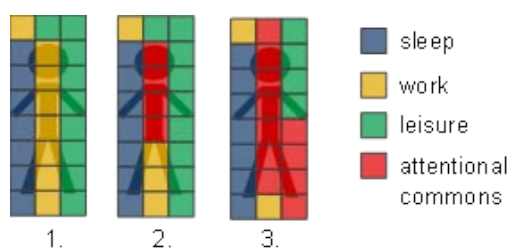


Figure 1. Individual Attention Space.⁴²

³⁷ As an example, see figures on Germany by Statista (2012), online at <http://de.statista.com/statistik/daten/studie/179970/umfrage/schlafen-schlafdauer-an-einem-normalen-werktag/>, last checked on 01.08.2015.

³⁸ Eurofound (2012): Fifth European Working Conditions Survey. Luxembourg, 34.

³⁹ Cecchinato, M.; Cox, A.; Bird, J. (2014): “I check my emails on the toilet”: Email Practices and Work-Home Boundary Management. Mobile HCI. Online at <http://www.drjonbird.e-vps.net/workhomeboundaries/papers/Cecchinato.pdf>, last checked 01.08.2015.

⁴⁰ For a more general view, see Bachmann-Medick, D. (see note 36), 288.

⁴¹ See Davenport, T.; Beck, J. (see note 9).

⁴² Eigene Darstellung.

As mentioned above, knowledge workers use their attention at work to produce, process or distribute information. Part of this is also to become or to be made aware of new information. In this respect, figure 1 makes an approximate distinction between two different eras of business. Figure 1 (2.) represents a time prior to the introduction of smartphones, social media, email, and pervasive use of open plan offices or open door policies, i.e. the 1970s or early 1980s. In this figure four hours⁴³ are high-lighted in red colour and described here as attentional commons.⁴⁴ This space is open to and frequently exposed to unplanned interruptions by others like for example telephone calls or people turning up in front of a knowledge worker’s desk. Therefore, the attentional commons can be identified as a space with low barriers to entry for third parties to gain the attention of an actor. It is a social space without a place and following Paul Churchland, this social space can be interpreted as an “intricate space of obligations, duties, entitlements, prohibitions, debts, affections, insults, allies, contracts, enemies, infatuations, compromises, mutual love, legitimate expectations, and collective ideals.”⁴⁵

Figure 1 (3.) depicts the approximate current situation in 2015. Here, the attentional commons has grown dramatically. The previously green (leisure) zone now marked in red refers to work related interruptions only. The previously orange (work) zone now marked in red refers to work and private matter related interruptions. The night can also be affected and as some research shows the distribution proposed here may well underestimate the situation of many individual cases:

“I get up, check my email in bed, I check my emails on the toilet, check my emails downstairs, maybe while I’m having breakfast. I generally don’t check my email when I’m actually walking to work,

⁴³ It might be slightly more or less. Given that time has moved on, it is difficult to assess. Figure 1 (2.) mainly serves as a comparative illustration to 1 (3.).

⁴⁴ The notion goes back to a much recognized New York Times article by Matthew Crawford, who used it in a slightly different context: Crawford, M. (2015): The Cost of Paying Attention. In: New York Times, 7 March, S. SR5. Online at http://www.nytimes.com/2015/03/08/opinion/sunday/the-cost-of-paying-attention.html?_r=0, last checked 01.08.2015.

⁴⁵ Churchland, P. (1996): The engine of reason, the seat of the soul. A philosophical journey into the brain. Cambridge, Mass.: MIT Press, 123.

but I do when I'm waiting for the train, on the train, maybe in the lift getting up to work, then at work, on the train on the way home, in front of the TV during dinner [...] I check it all the time."⁴⁶

In their research, Haejung Yun, William Kettinger and Choong Lee explicitly link the properties of the physical world with the more recently available digital options when they portray the smartphone as the "new open door". They quote claims by a smartphone manufacturer according to which people can "work 250 hours more per year thanks to Blackberry since you can deal with simple tasks while commuting or working outside."⁴⁷

Several drivers for growth of the attentional commons can be identified:⁴⁸

- The increasing use of open plan offices.
- Open-door office policies.
- Most knowledge workers using email at their desk.
- Increasing use of social media.
- Increasing use of mobile devices (particularly smartphones) at any work-related place (e.g. meetings, commute, travel etc.) and outside work.⁴⁹
- Due to the above, more channels available for private communication in the work space.

⁴⁶ Cecchinato, M. et al. (see note 39).

⁴⁷ Yun, H.; Kettinger, W.; Lee, Ch. (2012): A New Open Door: The Smartphone's Impact on Work-to-Life Conflict, Stress, and Resistance. In: International Journal of Electronic Commerce 16 (4), 121–152. For resulting patterns of addictive behaviour see also: Mazmanian, M.; Orlikowski, W.; Yates, J. (2013): The Autonomy Paradox: The Implications of Mobile Email Devices for Knowledge Professionals. In: Organization Science 24 (5), 1337–1357.

⁴⁸ For exemplary empirical data see Radicati (2015): Email statistics 2015-2019. Online at: <http://www.radicati.com/?p=12960>, last checked 01.08.2015.

Statista (2015): Statista Smartphone Dossier, online at: <http://www.statista.com/study/10490/smartphones-statista-dossier>, last checked 01.08.2015.

Perez, S. (2012): 80% Of Americans Work "After Hours," Equaling An Extra Day Of Work Per Week. In: Techcrunch, 02.07.2012. Online at <http://techcrunch.com/2012/07/02/80-of-americans-work-after-hours-equaling-an-extra-day-of-work-per-week/>, last checked 01.08.2015.

⁴⁹ The developments in this area are continuously tracked by the Good Technology™ Mobility Index, online at <https://media.good.com/documents/mobility-index-report-q1-2015.pdf>, last checked 01.08.2015.

A trend with symbolic character here are *bring your own device* (BYOD) policies of companies, allowing their employees to use their personal mobile devices for work-related tasks.

- Due to the above, more channels available for work communication in the private space.

The major shift here is that today there are likely to be more ad-hoc face-to-face interactions and "face-to-face relationships compete with a growing number of 'screens' that also compete for attention"⁵⁰ or as Sherry Turkle puts it: more often than not we are "alone together".⁵¹ This further underlines the conception of the attentional commons as a 'social space without a place' and intellectually links it to the spatial turn as the spatial turn puts emphasis on concurrence.⁵²

The Tragedy of the Attentional Commons

The attentional commons which can be identified in the attention space of an individual is more or less mirrored in the attention spaces of others. A detailed analysis is likely to show differences in the size of the attentional commons when it for example comes to knowledge workers in different industries, in different roles and on different levels of hierarchy of an organization. During the working day a purchaser in the supply chain management department is likely to be more exposed to the attentional commons than the divisional supply chain manager with a personal assistant sitting in an individual office. However, outside local office hours, the divisional manager may show more connectivity to the attentional commons, especially if the manager has offices from different continents reporting to her. For the purpose of this paper it will be sufficient to assume a similar average size of the attentional commons as depicted in Figure 2.

The figure shows the attentional commons as the largest zone in the attention space. As explained above, there is little doubt that the attentional commons takes up at least the share shown above.⁵³

⁵⁰ Dery, K. et al. (see note 8). See also Carr, N. (2011): The shallows. What the Internet is doing to our brains. New York: W.W. Norton. Gregg, M. (2011): Work's intimacy. Cambridge, UK, Malden, MA: Polity.

⁵¹ Turkle, S. (2012): Alone Together. Why We Expect More from Technology and Less from Each Other. New York: Basic Books.

⁵² See Bachmann-Medick (see note 36), 284, 300.

⁵³ One can easily think of more extreme scenarios: "...work use of a smartphone has the potential to become monumental in scale if employed widely on a 24/7 basis. Work use of OHS [office-home-smartphones] could potentially result in an organization-wide phenomenon where "every smartphone user is a mobile worker", Yun et. al (see note 44). S.142.



If this is the case and if the attentional commons today is much larger than only a few years ago and if attention is a scarce resource, questions regarding the implications arise.

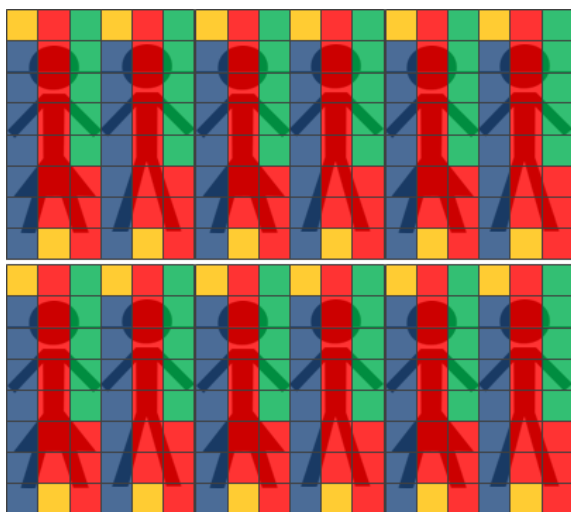


Figure 2. Most of the attention space occupied by the attentional commons.⁵⁴

It does not take much to realize that the symptoms for degradation described above can mainly, if not only be observed on the attentional commons. The symptoms of degradation did not bother knowledge workers to nearly the same degree when the attentional commons was still much smaller. Therefore, the degradation of the knowledge worker is the actual tragedy of the attentional commons. Evidence presented so far suggests that, due to digital technology, the issue has significantly gained momentum. But even independent from the digital disruption of the last years a range of studies which unearthed the negative effects of open plan offices point to challenges created by a larger attentional commons.⁵⁵

⁵⁴ Eigene Darstellung.

⁵⁵ Konnikova, M. (2014): The Open Office Trap. 7 January. In: The New Yorker, online at <http://www.newyorker.com/business/currency/the-open-office-trap>, last checked 01.08.2015.

Brennan, A.; Chugh, J. S.; Kline, T. (2002): Traditional versus Open Office Design: A Longitudinal Field Study. In: *Environment and Behavior* 34 (3), 279–299.

Hedge, A. (1982): The Open-Plan Office: A Systematic Investigation of Employee Reactions to Their Work Environment. In: *Environment and Behavior* 14 (5), 519–542.

Kaarlela-Tuomaala, A.; Helenius, R.; Keskinen, E.; Hongisto, V. (2009): Effects of acoustic environment on work in private office

In order to better understand the underlying situation, it can be useful to follow the traces of economists and social scientists who analysed other problems with more clearly visible commons before. Following Garret Hardin's seminal article in 1968,⁵⁶ economists ever since have been concerned with oceans, rivers, air, parklands or wildlife. The essential idea is that "resources held in common,[...]are subject to massive degradation,"⁵⁷ i.e. exactly what one seems to be facing on the attentional commons.⁵⁸ Two important characteristics of common property resources have to be noted: excludability and rivalry of consumption. To exclude actors from the commons may be costly or even impossible and the exploitation of the commons by one actor adversely affects others.⁵⁹

The problem today commonly known as the tragedy of the commons can be applied to the attention space. It arises as and when property rights are not clearly defined and enforced. On the attentional commons, the right over an individual's attention is not clearly defined and enforced. A knowledge worker, who decides to focus his attention on a particular task, loses this focus as soon as a colleague walks into the office, the phone rings or an email or message signals its arrival. As described above, the interruption comes at a cost. Regularly, this cost is not to be carried by the actor who caused the interruption. It is a negative externality.⁶⁰ As producers of

rooms and open-plan offices - longitudinal study during relocation. In: *Ergonomics* 52 (11), 1423–1444.

Pejtersen, J., Feveile, H., Christensen, K., Burr, H. (2011): Sickness absence associated with shared and open-plan offices — a national cross sectional questionnaire survey. In: *Scandinavian Journal of Work, Environment & Health* 37 (5), 376–382.

⁵⁶ Hardin, G. (1968): The tragedy of the commons. In: *Science* (New York, N.Y.) 162 (3859), 1243–1248.

⁵⁷ Feeny, D.; Berkes, F.; McCay, B.; Acheson, J. (1990): The Tragedy of the Commons: Twenty-two years later. In: *Hum Ecol* 18 (1), S. 1–19. 2.

⁵⁸ The attentional commons is not a synonym for the digital commons which deals with the opening and enlargement of the digital environment (Infosphere) in a more general way including bandwidth exploitation, information pollution and the impact of artificial actors. For literature on the digital commons; see note 10.

⁵⁹ See Feeny et al. (see note 55). 3.

⁶⁰ At least with respect to the activity currently carried out. Overall, an interruption may still be positive, e.g. when the actor prepares as investment transaction and a colleague informs about an unexpected decline in sales of the company in question. Negative and positive aspects are analysed by van Solingen et al. (see note 31).

externalities do not have to account for the costs created they have an incentive to destroy the commons. In Hardin's classical case the common meadow is overpopulated with cows. In turn, the attentional commons is swamped with messages and attempts to make contact with knowledge workers who at the end of the day conclude that they did not get their work done. Where the meadow is trampled down, the ocean is overfished and the air is polluted, the attentional commons is fragmented into smaller and smaller, potentially useless chunks of attention. Already in a two decades old study, mobile professionals were found to experience just over four interruptions per hour.⁶¹ About ten years later and thus still before the term smartphone was coined, another study saw knowledge workers facing a "one-to-one interruption per task ratio!"⁶² As described above, all this negatively impacts on productivity and wellbeing of the knowledge workers. The commons suffers.

Norms, Markets and Organizations to specify and enforce Attentional Property Rights

To overcome the tragedy of the commons, it is necessary to internalize external effects.⁶³ Prerequisites for such an internalisation are a clear specification of property rights, the freedom to exchange these rights and the absence of transaction costs. Under such circumstances, the involved actors can be expected to find a solution without requiring any intervention from a third party.⁶⁴ In social and in business reality these conditions do not exist and therefore, there is no decentralized market for attention providing a solution to the tragedy of the attentional commons. Yet, it appears that most organizations still expect such a decentralized solution to come about.⁶⁵ Be it open plan offices or smartphones, new technologies

are introduced to organizations, but individuals are expected 'to manage' them to their individual needs. They expect the individual to specify and enforce its attentional property rights.⁶⁶ At this moment in time, there is little evidence, that the individual actor does meet these expectations. However, in various settings institutional arrangements based on norms, markets or organizational rules are coming into play which specify and enforce attentional property rights. These will subsequently be briefly reviewed.

What can be observed in practice is the emergence of social norms which facilitate the internalisation of externalities.⁶⁷ In open office environments norms emerge which lead people who need to have some dialogue to escape to the corridor or into a meeting room, even if this not about a proper meeting. Regarding the idea of temporarily disconnecting from electronic communication and its social acceptance, the claim has already been successfully made that "analogue is the new bio".⁶⁸ A more specific example of internalisation of attention externalities comes from an international utility company: Seven top managers decided to reduce the number of emails they sent per day by at least 20%. They achieved a drop of 54% and without formal rules but because they followed their example 73 employees decreased their email output on average by 64%.⁶⁹ The emergence of social norms to deal with the attentional commons goes hand in hand with technological developments. This creates a demand for technology supporting those norms. So for example, applications like Offtime claim to enable people to customize their connectivity to their needs

⁶¹ O'Connell, B.; Fröhlich, D. (1995): Timespace in the Workplace: Dealing with Interruptions. In: CHI '95 Conference on Human Factors in Computing Systems, ACM Press, 262–263.

⁶² Czerwinski, M.; Horvitz, E.; Willhite, S. (2004): A Dairy Study of Task Switching and Interruptions. Hg. v. Proceedings of the SIGCHI conference on Human factors in computing systems. ACM. Online at <http://research.microsoft.com/en-us/um/people/marycz/chi2004diarystudyfinal.pdf>, last checked 01.08.2015.

⁶³ Richter, R.; Furubotn, E. (1996): Neue Institutionenökonomik. Eine Einführung und kritische Würdigung. Tübingen: J.C.B. Mohr (Neue ökonomische Grundrisse). 101.

⁶⁴ Coase, R. (1988): The firm, the market, and the law. Chicago: University of Chicago Press. 14.

⁶⁵ See Yun et al. (see note 46). 122.

⁶⁶ See for example Yun et al. on lack of formal policies (see note 46), S.142 and Dery et al. (see note 8), 560, on ubiquitous connectivity enhancing freedom. For strategies and behaviours developed by individuals, see also: Besseyre des Horts, C.; Dery, K.; MacCormick, J. (2012): Paradoxical consequences of the use of Blackberry's? An application of the Job Demand-Control-Support model. In: C. Kelliher und J. Richardson (Hg.): New ways of organizing work. Developments, perspectives and experiences. New York: Routledge (Routledge studies in human resource development, 19), 16–29.

⁶⁷ For theoretical explanations, see for example works by Edna Ullmann-Margalit and James Coleman: Ullmann-Margalit, E. (1977): The emergence of norms. Oxford: Clarendon Press (Clarendon library of logic and philosophy). Coleman, J. (1990): Foundations of social theory. Cambridge, MA: Belknap. 386.

⁶⁸ Wilkens, A. (2015): Analog ist das neue Bio. Eine Navigationshilfe durch unsere digitale Welt. 1. Aufl. Berlin: Metrolit Verlag.

⁶⁹ Brown, c.; Killick, A.; Arnaud, K. (2013): To Reduce E-mail, Start at the Top. In: Harvard Business Review (September).



and at the same time enhances acceptance for no or limited connectivity.⁷⁰

Next to norms, one can think of market oriented solutions to resolve the tragedy of the attentional commons. Designed market-based solutions have particularly been studied for communication between organizations and individuals. These are concerned with external effects due to constant interruptions which are internalized by means of charges for sending messages or making calls. The reasoning behind is that “if rights to perform certain actions can be bought and sold, they will tend to be acquired by those for whom they are most valuable for production or enjoyment.”⁷¹ Selling interrupt rights in form of e-stamps or similar approaches are mainly targeted at attention consuming marketing in form of spam or other forms of unsolicited communication from non-business partners.⁷² The suitability of market mechanisms within an organization or between existing business partners is still to be investigated.

Norms and market-based approaches have so far been very limited in their extent. Whilst market-based solutions are largely of theoretical nature, it is probably fair to say that the norms described above are still likely to be crowded out by increasing negative externalities as norms to internalise negative externalities compete with norms to accept and live with negative externalities. According to Mazmanian et al., “knowledge workers enact a norm of continuous connectivity and accessibility.”⁷³

Following the discussion of self-management, market mechanisms and social norms even in form of corporate culture, one avenue to solutions for the tragedy of the attentional commons is still missing:

explicit rules and policies in organizations. Again, it was Herbert Simon who first identified organisations as having a major influence on people’s attention:

*“Organizations and institutions provide the general stimuli and attention-directors that channelize the behaviors of the members of the group, and that provide the members with the intermediate objectives that stimulate action.”*⁷⁴

The option of dealing with externality problems by limiting the individual’s rights to act to improve the situation on the attentional commons is currently almost unexplored: In other words a company can develop, postulate and enforce rules and procedures to which employees are requested to conform. Early approaches in this respect are a ‘ban of smartphones in meetings’,⁷⁵ ‘flash warnings’ when people should be doing something else or the ‘ban of internal email’.⁷⁶ Approaching the topic from the perspective of the health & safety function of organizations, the inspection and audit organization TÜV promotes digital occupational safety.⁷⁷ Such approaches are bound to be accompanied by relevant efforts to train employees which has already proven to be effective.⁷⁸

Ultimately, also from a corporate perspective it seems possible to get the machine in between to help filtering, personalising and customizing information which is made available for an actor’s attention. Personal digital assistants based on technologies today called Google Now, Siri at Apple or Watson at IBM are likely to become very relevant to a future organization of the attentional commons.⁷⁹

⁷⁰ See for example: Offtime (<http://offtime.co/en>), Freedom (<https://macfreedom.com>), or SelfControl (<https://selfcontrolapp.com>), last checked 01.08.2015.

⁷¹ Coase, R. (see note 62). 12.

⁷² See Fahlman, S. (2002): Selling interrupt rights: A way to control unwanted e-mail and telephone calls [Technical forum]. In: IBM Syst. J. 41 (4), 759–766. Kraut, R.; Morris, J.; Telang, R.; Filer, D.; Cronin, M.; Sunder, S.: Markets for attention. In: E. Churchill, J. McCarthy, C. Neuwirth und T. Rodden (Ed.): the 2002 ACM conference. New Orleans, Louisiana, USA, 206. Templeton, B.: E-Stamps. Online at <http://www.templetons.com/brad/spam/estamps.html>, last checked 01.08.2015.

⁷³ Mazmanian, M.; Orlikowski, W.; Yates, J. (2013): The Autonomy Paradox: The Implications of Mobile Email Devices for Knowledge Professionals. In: Organization Science 24 (5), 1337–1357.

⁷⁴ Barnard, C.; Simon, H. (1947): Administrative behavior. A study of decision-making processes in administrative organization. New York: Macmillan.

⁷⁵ This is a controversial topic. See e.g. Patterson, L. (2014): Ban smartphones in meetings? Wait just a minute. Concur. Online at <https://www.concur.com/blog/en-us/ban-smartphones-in-meetings-wait-just-a-minute>, last checked 01.08.2015.

⁷⁶ Bennett, R. (2015): Email alert: full inboxes leave staff exhausted. In: The Times, 07.05.2015. Online at <http://www.thetimes.co.uk/tto/technology/internet/article4433004.ece>, last checked 01.08.2015.

⁷⁷ See: David, S. (2015): Digitaler Arbeitsschutz, online at <http://digitaler-arbeitsschutz.de>, last checked 01.08.2015.

⁷⁸ For example, Email training significantly reduces email defects. See: See Burgess et al. (see note 18).

⁷⁹ For further illustration, see Varian, H. (note 3).



Conclusion

The attentional commons is as space to watch. And practitioners in the field who read this paper may already benefit from a higher awareness for the attentional commons.⁸⁰ Just like the herdsmen in Hardin's fable ultimately have to come together to agree on rules which control access to the meadow, economic actors in the attention space have to develop, implement and enforce social rules to mitigate the tragedy of the attentional commons and to avoid a further degradation of the knowledge worker. This has been shown based on economic analysis which drew on a multitude of findings from interdisciplinary sources. A limitation of the current paper is that dedicated empirical research is still required to support and further substantiate the conclusions drawn here. The research conducted for this paper has also shown that many disciplines study the challenges named here. It appears that the tragedy of the attentional commons provides a useful conceptual focal point to achieve an understanding of the issues involved and to develop promising strategies for both individuals and organizations to cope with these issues. Due to the context of the issue, these strategies will have to build on latest technology. And the strategies are likely to follow the described avenues for norms-, market- and organization-based solutions.

⁸⁰ Solingen et al. (see note 31) confirm this even for steps later in the process: "The most important benefit of an interrupt measurement program is the creation of interrupt awareness".

