# European Public Administration and Digital Sovereignty

Malte Schmidt-Tychsen[†]

***Disclaimer:*** *The views and opinions expressed in this paper are those of the author and do not purport to reflect the opinions or positions of any agency of the Federal Government of Germany.*





† Head of Digital Core Services, B 7, Federal Office for Building and Regional Planning (BBR), Straße des 17. Juni 112, 10623 Berlin, Germany, Malte.Schmidt-Tychsen@BBR.Bund.de or MST@Penguin-IT.com

1 https://creativecommons.org/licenses/by/4.0/

## Executive Summary

1. Overlapping direct and indirect network effects, combined with various types of lock-in make Microsoft Windows irreplaceable. Especially for smaller administrations with limited resources.

2. There is clear incentive for Microsoft to force its existing Windows customer base into its public cloud offering and evidence that we are already seeing Microsoft implement various strategies towards this goal.

3. Independent Microsoft public cloud deployments, operated by independent European entities in Europe under European jurisdiction, would comply with European and national standards privacy and classified information standards, but also increase European dependency on Microsoft.

Compliance and secrecy are possible, if Microsoft allows European entities to operate independent instances of its cloud offerings. But sovereignty is not, because they depend on Microsoft's approval, which can be effectively withdrawn in less than a year, rendering local instances inoperable.

Digital Sovereignty can thus only be achieved on a platform over which European public administrations have more control. Since the dependency on Microsoft Windows will remain strong for the foreseeable future, this platform must also be available on Windows.

A digital platform derives most of its value from network effects, which are a direct result of the success and thus market share of said platform. As widespread adoption of said platform becomes essential to the goal of digital sovereignty, the requirements must reflect this. The digital platform must be:

01. Easy to use,
02. Easy to obtain, install and operate,
03. Able to run on a widely available and sovereign software stack,
04. Compatible with all commonly used client operating systems,
05. Modular and easy to extend, for example with an app store,
06. Made with attractive features to woo a large audience,
07. F/LOSS for security of investment,
08. An existing, viable product, as creating software from scratch takes a very long time,
09. Already popular,
10. Massively scalable from single user on low powered devices up to millions of users.

As most of the utility of a digital platform is rooted in network effects, a single platform, shared by all European public administrations, will deliver the greatest value to European users and businesses alike. Delivering this value is as much a promotional and communication effort as it is a technological and political challenge, as stakeholders need to understand the utility of coalescing onto a common platform. Digital sovereignty isn't readily apparent to end users, as opposed to the numerous benefits that come with the ever-increasing market share, creating a positive feedback loop.

**Either Europe will succeed in promoting a common, sovereign digital platform, or it will end up using a common digital platform without digital sovereignty, as network effects reign supreme.**

Network Effects and Lock-In on digital platforms, specifically Microsoft Windows

Network effects account for an overwhelming share of value in tech.[2] We see a variety of direct and indirect network effects[3] across different digital platforms. There has been considerable research on multi-sided markets and network effects. But so far, the European Commission's focus has been on economic outcomes, competition in markets, and consumer welfare. On the one hand, network effects reduce competition through market concentration; on the other hand, the emergence of a dominant platform increases consumer welfare, as network effects that benefit consumers often outweigh the negative effects of monopolization.[4] It has also been found that digital platforms act as economic agents in a strategy to achieve at their monopolistic position,[5] for example by developing and implementing strategies to tie existing customers to their platform.[6]

This has been particularly true for Microsoft and its products Windows and Office, possibly even before their introduction. In 1995, Baseman, Warren-Boulton and Woroch wrote an antitrust bulletin[7] detailing Microsoft's predatory licensing strategy to manipulate the desktop operating system market since the early 1990s or even earlier.

Microsoft Windows is a digital platform in a multi-sided market. Computer manufacturers (OEMs) license this platform to sell with their hardware. Customers buy the platform as well as third-party software from independent software vendors (ISVs) and additional hardware products to extend their original purchase. These parties all prefer the platform with the largest group on the other side(s). Bill Gates himself calls the competition between digital platforms "winner-take-all markets", in which a single company will triumph.[8] He goes on to explain that even if one platform offers 90% of the third-party software applications a competing platform is offering, it will fail and the competing platform will remain as the single, dominant platform. This is true of Microsoft Windows, because of various overlapping direct and indirect network effects and vendor lock-in of various software products that reinforce each other and solidify Windows' position as the sole operating system for the desktop computer in most office environments around the globe.

An ISV will invariably prioritize the platform with the greatest number of users. Particularly when the target audience is limited in size. For niche markets a single platform offers significant value, as the ISV will only need to tailor to a single target platform. When Sun introduced Java, offering a single platform that can run on numerous operating systems (write once, run anywhere), Microsoft correctly perceived this as a threat to its desktop monopoly.[9] In response, Microsoft employed various

2 https://medium.com/@nfx/70-of-value-in-tech-is-driven-by-network-effects-8c4788528e35
3 https://medium.com/@nfx/the-network-effects-manual-13-different-network-effects-and-counting-a3e07b23017d
4 https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3024225
5 https://joint-research-centre.ec.europa.eu/reports-and-technical-documentation/competitive-landscape-online-platforms_en
6 https://hbr.org/2019/01/why-some-platforms-thrive-and-others-dont
7 https://eml.berkeley.edu//~woroch/hardball.pdf
8 https://youtu.be/W5g4sPi1wd4?t=702
9 https://www.researchgate.net/publication/4820278_Network_Effects_in_the_Microsoft_Case

strategies to protect its position, including the well-known “Embrace, Extend, Extinguish”[10] approach, which led to an antitrust complaint lodged by Sun Microsystem at the European Commission. Consequently, the European Commission adopted a notable decision (Case COMP/C-3/37.792 - Microsoft)[11] that Microsoft knowingly abused its monopoly. The full text of the aformentioned decision contains the aformentioned conclusions and provides a detailed explanation thereof.[12] It goes on to explain that any software product that exposes an API for other software products to interact with becomes a platform. This can enhance the dependency on an underlying platform, as each of those software products independently require the underlying platform. Even if a majority of them could be run on an alternative underlying platform, a complete switch to the alternative remains impossible as long as a single interconnected dependency relies on the original underlying platform. The integration of software products via APIs, which enables the seamless transport of machine-readable content between systems, lies at the heart of ongoing digitization efforts in both the public and private sectors.

Even in the absence of seamless integration between disparate digital products, organizations will invariably strive to operate as few digital platforms as possible. A single machine is preferable to two or more machines for an office worker, as they require space and power to run. Furthermore, data can be copied easily between applications on a single machine. As operating systems are complex and consume resources for maintaining and operating them, both users and administrations will prefer a single system to run all applications. This is particularly evident when considering the diverse range of specialized skills required to operate and administer complex systems. This effect extends beyond a single organization. The prevalence of Microsoft Windows and Microsoft Office facilitates the transfer of skills and complex documents on an international scale, thereby conferring significant value to all office workers globally.

In its decision (Case COMP/C-3/37.792 – Microsoft), the European Commission further concluded that there are no realistic substitutes on the demand-side for client PC operating systems. Creating one would be prohibitively expensive, as the whole ecosystem of accompanying hard- and software would have to be recreated. Furthermore, it was found that in industries exhibiting strong network effects, consumer demand depends critically on expectations about future purchases. If consumers expect a firm with a strong reputation in the current (product) generation to succeed in the next generation, this will tend to be self-fulfilling as the consumers direct their purchases to the product that they believe will yield the greatest network gains. A competing desktop operating system would not receive significant investment from either ISVs in the form of training developers to write software for that competing operating system or from OEMs supporting it, as such an endeavor is expected to fail, given the current position of Microsoft Windows.

A rich API provides numerous avenues for more seamless integration of software or hardware products with a digital platform. The  greater the investment in integrating a third-party product with a particular platform the better it will function on that platform. Conversely, the more competing

10 https://en.wikipedia.org/wiki/Embrace,_extend,_and_extinguish
11 https://op.europa.eu/en/publication-detail/-/publication/4c481c56-831a-4ee2-ba3f-4240e2fda230/language-en
12 https://ec.europa.eu/competition/antitrust/cases/dec_docs/37792/37792_4177_1.pdf

platforms an ISV must support, the fewer resources they will have available for integration with each platform. Microsoft has been aware of this since at least 1999, as evidenced by a quote from an internal memo:[13]

> *"The Windows API is so broad, so deep, and so functional that most ISVs would be crazy not to use it. And it is so deeply embedded in the source code of many Windows apps that there is a huge switching cost to using a different operating system instead […]*
>
> *It is this switching cost that has given customers the patience to stick with Windows through all our mistakes, our buggy drivers, our high TCO, our lack of a sexy vision at times, and many other difficulties. […] Customers constantly evaluate other desktop platforms, [but] it would be so much work to move over that they hope we just improve Windows rather than force them to move.*
>
> *In short, without this exclusive franchise called the Windows API, we would have been dead a long time ago."*

As the complexity of integration increases, the investment in supporting the API and developing for a digital platform also rises over time. This is due to the growing familiarity of ISVs with the platform, as well as their investment in platform-specific tools, software libraries, and training. A single platform enables the transfer of skills, certifications, and software modules across industries. Its complexity serves as a powerful lock-in mechanism.

Another powerful lock-in mechanism is present in the integration of complex systems that deal with structured data. To illustrate, the data that an organization enters into a business management software (ERP for private or public sector, for example Oracle NetSuite) becomes fused with the product. This is because it is often impossible to differentiate between the data and its structure. The latter of which is a property of the specific database structure of the business management software. Consequently, it becomes almost impossible to extract all information for a complete migration of the data, as the information only makes sense in a specific context, which is part of the original product. Furthermore, the skills acquired by the numerous members of an organization through using a specific, complex tool over an extended period of time represent an additional, possibly even stronger lock-in effect. The value of a specific tool to an organization increases as it becomes more integrated with the organization and the complexity of the automated tasks grows. In fact, specific software tools are typically an integral part of a process and vice versa. Such processes can and do even become enshrined into laws. The phenomenon of lock-in will then reinforce the strength of network effects in a feedback loop. Market participants are aware that digital platforms that do not achieve dominance will fail, forcing users and developers to switch, despite the potential for massive write-offs associated with that switch. Microsoft, for instance, eliminated two of its mobile platforms, Windows Mobile and Windows Phone, which resulted in the eradication of billions of dollars that customers, OEMs and ISVs had invested in those platforms. It is therefore of the utmost importance for market participants to identify and invest in a platform that is unlikely to be eradicated, thereby safeguarding their investments. The platform currently in the dominant position is typically the most secure option.

13 https://ec.europa.eu/competition/antitrust/cases/dec_docs/37792/37792_4177_1.pdf (463)

To illustrate the intricate relationship between network effects and lock-in effects on digital platforms within an organization, consider a software tool utilized for a specific purpose within a government organization working in a specialized industry. The software tool undergoes continuous improvement over time, with regular incremental investments in training and new features. Members of the government organization are becoming more proficient in the use of this complex tool through both regular training and daily usage. Both of these constitute investment into the software tool and the underlying platform it depends upon. New data is continuously inputted into this tool on a daily basis, thereby enhancing the value of its database. Consequently, the organization becomes increasingly dependent on the software. Nevertheless, the reasons for these lock-in effects are beneficial to the organization because the tool becomes more valuable with increased usage and enhancement. This lock-in encompasses the underlying platforms on which the tool is dependent. For the majority of tools, that platform is Microsoft Windows. The use of Microsoft Windows ensures a wide variety of compatible hardware and third-party support, as well as readily trained and certified job candidates. The superiority of Windows as a digital platform is solely based on its market share.

Even if all other software tools the aforementioned organization is using do not depend solely on Microsoft Windows, investment into digitization locks it into Windows regardless, because it continues to choose products and services that are compatible with its existing software applications. Investments into these interfaces that connect the various tools are in part investments into the specific software tool that depends on Windows, thus increasing the lock-in of that platform. This, in turn, increases the efficiency of the organization. An alternative approach would be for the organization to invest in a different software tool that does not depend on the proprietary platform or extend existing tools that do not depend on the proprietary platform to include the functionalities of the specific tool. However, if the proprietary platform offers significant network effects and if some of the software tools already depend on that platform, it is strategically advantageous for the organization to unify on said platform in lieu of a credible alternative.

Such examples can be found throughout the European Union. They demonstrate not only the extent to which government organizations rely on the Windows platform, but also the growing dependence on this platform as a result of the digitization efforts being undertaken across the Union. Furthermore, they illustrate that the underlying reasons for lock-in effects, namely increased sophistication, integration and efficiency are highly desirable. As an agent, Microsoft is attempting to increase and enhance lock-in through technological means. However, lock-in through decades of use and investment is likely to exceed those efforts.

At times, lock-in can be stronger than efforts to remain compliant with legal frameworks and processes. In 2006, the legislative body of the city of Berlin requested that the city's administration develop a strategy to replace Microsoft Windows. However, the administration of Berlin was unable to comply with this request and deemed it impossible.[14] Despite the declaration by several data protection agencies in some European states that using Microsoft Teams violates the terms of the

14 https://www.heise.de/news/Berliner-Senat-sperrt-sich-gegen-vollstaendige-Linux-Migration-131694.html

General Data Protection Regulation (GDPR), this assessment has not been universally heeded. Schools and other government organization have continued to utilize Microsoft Teams, despite these assessments. These examples illustrate that a digital product or service that is common, useful, attractive and easy to use will often be used even if there are compliance or confidentiality issues.

Over the past two decades, the requirements for operating IT systems with regard to security have undergone a profound transformation. Most software depends on a regular and continuous stream of security updates. Otherwise, it would be susceptable to automated attacks deployed in mere days after a security flaw has been discovered. The focus has shifted from the purchase of software as a product to service contracts that deliver frequent and compulsory security updates. As long as the software remains proprietary, only the company that originally wrote the software may be able to deliver that constant stream of updates. Any organization that utilizes this software is dependent on the company for those updates, regardless of whether they rent it as a cloud service or run it on their own hardware locally. The deployment of Microsoft software in locally controlled data centers in Europe[15] has the potential to enhance compliance with European data protection laws and facilitate the handling of confidential information. However, it is unlikely to contribute to digital sovereignty, as there is little distinction between being reliant on the consistent provision of security updates and being dependent on the continued collaboration of a cloud operator.

## Conclusion

In conclusion, the majority of the utility derived from digital platforms is a result of network effects. In other words, the value of Microsoft Windows is not determined by any inherent property or feature of the product itself, but rather by its market share. A digital platform provides utility based on popularity. While technological shortcomings of digital products can be overcome, there is no substitute for market share. A supplier of a digital product or service will always select the platform with the largest potential customer base, even if faced with significant logistical or technological challenges. Microsoft Windows, for instance, provides substantial utility to both customers and suppliers through direct and indirect network effects, and it effectively locks them into Microsoft's ecosystem.

An IT strategy that employs multiple solutions for a single purpose in order to preserve digital sovereignty fails to account for network effects, particularly if the solutions exhibit the characteristics of a digital platform. As the majority of digital products and services increasingly offer features for seamless integration with one another, they become platforms in and of themselves. A strategy based on diversity would result in costly and challenging migrations from discontinued products and services as markets concentrate on the most successful platforms. To illustrate, the purchase and use of OS/2[16] and BeOS[17] in conjunction with Microsoft Windows as desktop operating systems during the 1990s would have precluded public administrations from deriving benefits from direct and indirect network

15 https://www.capgemini.com/news/press-releases/capgemini-and-orange-are-pleased-to-announce-the-launch-of-commercial-activities-of-bleu-their-future-cloud-de-confiance-platform/

16 https://en.wikipedia.org/wiki/OS/2

17 https://en.wikipedia.org/wiki/BeOS

effects and would not have facilitated digital sovereignty, as it would not have prevented their demise and eventual discontinuation. This remains unchanged. A platform strategy based on diversity will not only have a detrimental impact on public administrations, as they will not benefit from network effects, but it will also have no effect on Digital Sovereignty, as it will not prevent the demise of smaller platforms.

In contrast, public administrations should prioritize digital sovereignty over the platforms they rely on and strive for unified integration so they won't have to worry about lock-in. Deep integration with digitized processes and a workforce that is highly trained on complex tools is very desirable. Most importantly, those platforms need to be successful in attracting massive amounts of users and suppliers beyond public administrations in order to benefit from network effects. In a winner-take-all market, you either go big or you go home.

Microsoft moving its customers into their public cloud service

In 2014, Microsoft announced its “mobile first, cloud first” strategy.[18] The mobile aspect of this strategy was unsuccessful[19] and only “cloud first” remains. This “cloud first” strategy has proven to be extraordinarily successful. Microsoft’s market capitalization, which had been hovering around US$400 billion for over a decade prior, has risen sharply since 2014, surpassing US$3 trillion in 2023. Concomitantly, the proportion of Microsoft's revenue derived from its cloud services has also increased exponentially, reaching parity with that of the entire traditional product line in 2019.[20]

In consequence, Microsoft has implemented a radical transformation of its business model. Previously, Microsoft Windows functioned as a monopoly platform, generating profits through the release of new versions every three years. Microsoft could compel customers to upgrade to the latest version by discontinuing support for older versions. The market for desktop operating system was largely comprised of different versions of Microsoft Windows (for example Windows XP and Windows Vista). In contrast to this, Windows 10 is only sold once. Subsequent updates are free of charge, even to Windows 11, as users are granted a perpetual license. Not charging for a product in which Microsoft owns a monopoly appears to be a paradoxical business strategy. Yet this decision is accompanied by soaring profits and a ballooning market capitalization. The reason is that Microsoft 365 is even more profitable than the aforementioned monopoly. Microsoft exploits its monopoly in operating systems to redirect its customer base towards its more lucrative public cloud services. The integration of Windows with Microsoft 365 is already substantial, and this relationship is likely to become even more closely entwined over time. Popular products such as Skype for Business were discontinued and replaced by cloud services with the same name. It has become increasingly challenging to install Windows without establishing an account on Microsoft 365. It can be reasonably anticipated that Microsoft will cease the production of most of its software products in the near future, with cloud services offering similar functionality and bearing similar names taking their place. They have already deprioritized many of their products such as Microsoft Office, for which they drastically reduced their support. Microsoft Exchange is already End-Of-Life next year in 2025. Given the necessity for security updates, Microsoft could compel Windows users to utilize their public cloud within months if they integrated their operating system with their cloud offerings.

As previously outlined in this paper and its principal reference[21], Microsoft has a long history of leveraging its dominant position in the market for desktop operating systems in vertically integrated markets. This documented behaviour can be taken to almost comical extremes, as when Microsoft was still struggling to gain traction in the mobile phone and tablet markets and created a single unified user interface for all device classes. Microsoft compelled customers of its monopoly desktop operating system to utilize this user interface despite the fact that it was nearly unusable on the traditional

18 https://news.microsoft.com/2014/03/27/satya-nadella-mobile-first-cloud-first-press-briefing/
19 https://www.theguardian.com/technology/2015/jul/08/microsoft-layoffs-mobile-phone-business
20 https://www.geekwire.com/2019/microsoft-milestone-tech-giants-cloud-revenue-now-matches-traditional-products-analyst-says/
21 https://ec.europa.eu/competition/antitrust/cases/dec_docs/37792/37792_4177_1.pdf

desktop.[22] Microsoft also introduced a common developer platform to enable the creation of applications that operate across desktop computers, tablets, mobile phones and gaming consoles. Additionally, it established a central app source to facilitate the purchase and sale of these applications online, with the objective of maximizing network effects across all Microsoft products.

Despite the failure of Microsoft's initial efforts to unify and subsequently dominate the markets for most user-facing device platforms, the company has intensified its efforts to dominate the cloud market to which those devices connect. As previously discussed, a single cloud platform or a single user-facing cloud operating system offers significant advantages over multiple different clouds from different vendors. For instance, through the use of artificial intelligence, which is fed by a unified store of vast amounts of ordered customer data, the system is able to assist with the creation and advancement of digital processes. As computing transitions from the desktop and server to the cloud, users benefit from a unified cloud offering, that is analogous to the current practice of operating one desktop computer and a single operating system rather than multiple operating systems on disparate machines sitting next to each other on an office desk. Microsoft aims to become the dominant cloud computing environment in the future, similar to its current dominance in administrative computing with Microsoft Windows and Microsoft Office. Financial investors appear to concur with this vision, as evidenced by the exponential increase in Microsoft’s market capitalization. The various and partly overlapping direct and indirect network effects and lock-in effects apply to cloud offerings as much as they apply to other digital platforms. Most direct and indirect network effects apply equally to the centralized Microsoft 365 public cloud as well as to Microsoft 365 operated in independent, private data centers. Each additional customer or supplier that a digital platform or ecosystem can acquire increases its value. This is why Microsoft is not fundamentally opposed to the idea of on-premise installations of Microsoft 365.

Cloud operators possess the ultimate authority over the data on their platform and make the decisions over the ease or difficulty of sharing that data with other cloud platforms, enabling or hindering their potential competition to grow. Judging by the well-published history of Microsoft’s business practices,[23] it can be reasonably assumed that Microsoft will severely limit useful access to said data outside its ecosystem once it has reached a dominant position in the market. This will severely limit the usefulness of competitors, squeezing them out of the market. In the complex and fast-moving world of technology, legislation to force access to data can only be a partial solution, and court cases can take longer than the lifespan of an IT company.

Microsoft 365 is likely to be the dominant cloud platform for office workers in the future, because network effects will be much higher when using a single digital platform over the usage of several competing platforms. The customer base is already growing exponentially, triggering positive feedback loops as more and more players on all sides of this attractive platform get on board, while the ecosystem around it grows. This in turn secures long-term investment in the platform.

22 https://www.youtube.com/watch?v=WTYet-qf1jo&t
23 https://ec.europa.eu/competition/antitrust/cases/dec_docs/37792/37792_4177_1.pdf

Public administrations in Europe and around the world, at all levels and for all functions, depend on Microsoft Windows to fulfill their mission. Without it, they would cease to function.[24] This will not change in the short or medium term, even if unlimited funds were to be allocated to create an alternative digital platform, because the resources required for such a mammoth task do not exist. In addition, many public administrations perform functions that require them to run specialized software particular to a specific sector of the economy, which will remain tied to the Windows platform even if office work in public administrations can be accomplished on another platform. The reasons for the strong position of Microsoft Windows are various direct and indirect network effects and lock-in described in the first section of this paper.

If the EU wants Digital Sovereignty for its office work, this dependence on the Microsoft-controlled Windows platform would have to be both respected and reduced. Because network effects are central to the value of a digital platform, market participants are closely watching each other for reactions to the integration of Microsoft Windows and Microsoft 365 public cloud services. Any investment into that ecosystem by a larger party serves as a signal to other market participants. Investments by larger European public administrations in compliant but dependent, self-operated on-premise or private cloud instances of Microsoft 365[25] will likely lead other organizations to embrace the move towards Microsoft's public cloud offerings. However, the self-operated instances of Microsoft 365 will most likely never cover the entire range of Microsoft's product line, and their operation is contingent on Microsoft's full and willing cooperation. It is possible that attractive, individual products such as Microsoft Teams could be placed in or removed from of the private cloud at any time, thereby forcing customers to use the public cloud.

Any alternative to the strong and continuing dependence on Microsoft would need to respect the immense value of network effects as oulined in the initial section of the paper. Both for Microsoft Windows, as well as for any potential alternative. Consequently, the alternative would have to be tightly integrated with Microsoft Windows and attain a significant market share as a unified product. Each additional participant in this alternative digital platform increases the value for all participants.[26]

A digital platform need not be a product; it can also be a standard to which competing products are created. This approach addresses the issue of Digital Sovereignty. Nevertheless, any sufficiently complex standard necessitates the existence of a reference implementation. An implementation is a tangible product, and thus, whoever controls that implementation controls the standard. Consequently, the alternative must be a product in any case, regardless of the EU's intention to establish a standard.

24 https://www.cio.bund.de/SharedDocs/downloads/Webs/CIO/DE/digitale-loesungen/marktanalyse-reduzierung-abhaengigkeit-software-anbieter.html

25 https://www.capgemini.com/news/press-releases/capgemini-and-orange-are-pleased-to-announce-the-launch-of-commercial-activities-of-bleu-their-future-cloud-de-confiance-platform/

26 https://en.wikipedia.org/wiki/Metcalfe%27s_law

It is of paramount importance to note that digital platforms are inherently “winner-take-all”. Consequently, the success of this product will either be immense and result in its global ubiquity, rivaling brands such as Linux or Apple, or the endeavor to enhance Digital Sovereignty will not gain sufficient traction in the face of competition from Microsoft 365. The endeavor must be structured in a manner that is conducive to its success in this specific setting. A half-hearted attempt would thus be doomed to fail. Nevertheless, through the phenomenon of network effects, this investment, should it be successful, has the potential to generate a significant return. Rallying behind a feature-rich and highly integrated common digital platform could supercharge the digitization of European public administration from small municipalities on the periphery of the Union all the way to metropolises like Madrid or Brussels. Robert Metcalfe predicts that the network effect will be so strong that the value of the product to its users will grow exponentially as their numbers increase.[27]

In order to achieve a dominant market share, such a platform must possess a number of attractive features that will encourage a significant number of users to adopt it. In addition, it must be scalable, so that it can be useful to one or two users as well as large organizations or cloud operators with tens or even hundreds of thousands of users. Furthermore, in order to ensure optimal marketability, it must be a tangible product. In order to provide a safe investment opportunity, it is necessary that the ecosystem be both successful and that the amount of control that a single entity holds over the product be limited. The latter of which can be achieved by an open source license and a transparent development process as well as a well-structured, modularized and documented code base. Such a development process and open source license instills confidence in ISVs and potential users that the product cannot  be significantly altered in a manner that does not benefit them. This is because they could otherwise create their own fork[28], or version, of the product. The Linux kernel provides an illustrative example of a successful project in which numerous competing entities play an active role for the benefit of all. Even Microsoft invests a significant amount of resources into the Linux kernel project, expecting a high return on those investments.

In addition to the source code and the product itself, which can be freely distributed and operated independently, the central entity responsible for developing the product has other means of control. The brand name is a powerful tool in and of itself.[29] Furthermore, a central platform can still have a lot of value, even if instances of the software run independently, especially considering the network effects. In the case of the Android operating system, in which each instance is independent and each producer sells phones with an individually customized version of Android, this would be Google Play, the central platform for the purchase and sale of applications. In order to maximize trust in the platform, central services and control over the brand should be held by an organization that is trusted by as many parties as possible and that will not relinquish control to other, less reputable organizations. One potential solution is the establishment of a nonprofit organization. The Mozilla Foundation is a suitable example of such an organization.

27 https://link.springer.com/article/10.1007/s11390-015-1518-1
28 https://en.wikipedia.org/wiki/Fork_(software_development)
29 https://blog.documentfoundation.org/blog/2020/10/12/open-letter-to-apache-openoffice/

In addition, the product must conserve the resources required for installation, administration, and usage. To that end, it must be straightforward to use, straightforward to install, and straightforward to operate on readily and widely available infrastructure. The ease of installation, administration, and use is essential in order to provide digital sovereignty to small public administrations with limited resources, which are common throughout the EU.

As IT products often require significant time to mature, it is preferable to select an existing product over a new one. Furthermore, a product that builds upon proven and widely used technological foundations is optimal. Additionally, in order to attract a large number of users, it is beneficial to select an existing product, as it allows for consideration of their existing popularity as an added criterion, which is the best indicator for mass appeal. This criterion encompasses the consideration of third-party participation in the ecosystem, as the size and attractiveness of such entities must be evaluated when assessing the potential for growth of an IT platform.

The optimal environment for the product is a web browser, as the web browser has become the universal end user platform and web browsers are universally available on user-facing computing devices. The technological limitations within a web browser have been significantly expanded over recent years, to the extent that even complex media applications, such as diagram editors[30] and photo editors[31] can be executed entirely within the browser. Integration with existing digital platforms, such as apps for smartphone operating systems, not only enhances usability but also increases visibility. Furthermore, their existence serves as an indicator of the popularity and potential of a digital platform.

A product released under a permissive license allows both self-operation and contracting out the operation to a cloud provider. Small government agencies may, for example, utilize an instance of this software operated by a local provider, while larger agencies may run their own copy of this software in their data center.

In conclusion, a single digital platform for office work in public administrations must be selected and extensively promoted.  Furthermore, it is essential to emphasise that this initiative will only succeed with the collaboration of the existing private software industry, which develops and maintains products for government agencies. Although the new platform may compete with their current offerings in certain respects, the common digital platform encourages significant investment in IT products and services due to its ability to mitigate uncertainty surrounding the legal compliance of cloud products. Private enterprises need to be assured that the development of this new, common platform aims to be similar to the Linux kernel project[32], another highly successful digital platform, upon which numerous products and services are created that are worth billions of euros and sold

30 https://app.diagrams.net/
31 https://www.photopea.com/
32 The Linux kernel is the foundation for hundreds of billions of dollars in revenue for a wide variety of companies that either offer services running on Linux in their data centers or sell devices that run on Linux. Many of those companies help to jointly develop the Linux kernel and extend it to their benefit. See: https://www.tecmint.com/big-companies-and-devices-running-on-gnulinux/

globally. The digital platform will facilitate growth, rather than impede the revenue of European IT companies. The only alternative to the common office platform under European control is a common office platform under US control which could have a detrimental impact on the viability of many European IT companies. This is because they could be removed and banned from that platform.[33]

33 https://www.bbc.com/news/technology-58669512