

*Article*

# Understanding How Open Government Data is Used in Capital Accumulation: Towards a Theoretical Framework

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## ABSTRACT

This article examines the role of open government data in capital accumulation. Open government data is a relatively new phenomenon that involves the pro-active and regular release of government data, in the form of downloadable records, for use and re-use by anyone. Private capitalist enterprises are among those who make use of such data. Publicly produced data is transferred into the hands of private capital through a non-rivalrous form of enclosure. Capital then uses government datasets to create new commodities by the application of skilled labor to the data, in processes including data mashup and data visualization. Inherent in all commodity production is the extraction of surplus value from labor by capital. This, together with the process of enclosure, provides opportunities for capital accumulation from open government data.

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## INTRODUCTION

Open government data is a relatively new phenomenon, and one which the record-keeping community has been quick to engage with. In the UK, the government's main open data portal, [data.gov.uk](http://data.gov.uk), was launched in 2010. The Open Data Institute (ODI) was launched in 2012 and, in the same year, one of the first articles engaging with open data from a records management perspective appeared. In the article, Anne Thurston argued that open government data comes from government records, and good record-keeping practices must underpin the data in order to ensure that it is accurate, traceable, and reliable.<sup>1</sup> Valerie Léveillé and Katherine Timms likewise argue that:

Government records, created, maintained, and preserved as evidence of government activities, are the primary sources from which open government information must derive.<sup>2</sup>

Public sector record-keepers are likely to be the workers tasked with ensuring open government data is as complete and reliable as it can be, in order for its full potential to be unlocked. They are likely to be among those responsible for making the data interoperable and usable to wide audiences, as well as being responsible for preserving published datasets.<sup>3</sup>

It is important, therefore, for record-keepers to engage with theoretical concepts dealing with data, in order to critically examine new phenomena in our working lives. The process of making open government data available to anyone for any purpose has been a key part of an openness agenda which has been almost universally welcomed as positive by information professionals, politicians, and civil society actors. Both the UK and EU's governing institutions, for example, have lauded the potential of open government data to bring benefits across the economy and society.<sup>4</sup> While welcoming its many positive elements, we should interrogate this agenda to identify its potentially problematic elements.

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<sup>1</sup> Anne Catherine Thurston, "Trustworthy Records and Open Data," *The Journal of Community Informatics* 8, no. 2 (2012), <http://www.ci-journal.net/index.php/ciej/article/view/951>.

<sup>2</sup> Valerie Léveillé and Katherine Timms, "Through a Records Management Lens: Creating a Framework for Trust in Open Government and Open Government Information," *Canadian Journal of Information and Library Science* 39, no. 2 (2015): 73.

<sup>3</sup> Elizabeth Shepherd, "Freedom of Information, Right to Access Information, Open Data: Who Is at the Table?" *The Round Table: The Commonwealth Journal of International Affairs* 104, no. 6 (2015): 724.

<sup>4</sup> *Ibid.*, 723.

This article is mainly concerned with how capital is benefiting from the production and release of open data. Writing from a Marxist standpoint, I aim to determine whether the capitalist class is able to exploit the existence of open government data for its own main purpose; that of accumulating capital through the exploitation of the working class. This is an issue of key political, and arguably moral, importance since open government data is produced as a public good in the public sphere, nominally subjected to common ownership.<sup>5</sup> While nominally usable by every citizen for any purpose, in reality it is mostly used either by government agencies or capitalist enterprises.<sup>6</sup> Open government data is therefore a means by which public wealth can be transferred to private capital. This article proposes a theoretical framework that will be used in a forthcoming critical case study of the production and release of an open government dataset, and which could be used to uncover the extraction of surplus value from data in other contexts and instances.

I begin by discussing some critical approaches to open government data, most significantly Jo Bates' criticism which ascribes to open government data an important strategic role in a particular political project; that of neo-liberalism.<sup>7</sup> I am concerned here with a more fundamental issue; the role of open government data in capital accumulation itself, rather than any particular political project of capital. I go on to examine the means by which this capital accumulation can possibly take place, within a Marxist theoretical framework. Firstly, I accept Marx's labor theory of value, which states that, aside from nature, labor power is the sole source of value of any produced thing.<sup>8</sup> Drawing on ideas from information economics, I define open government datasets as "information goods," a definition which has important implications for how their value is determined by labor power.<sup>9</sup> I adopt Ursula Huws' schema of labor in the digital economy as a means to determine which types of labor applied to open government datasets might directly produce a surplus for capitalist enterprises.<sup>10</sup> Recognizing that surplus value is not the only means of capitalist accumulation, I engage with existing literature around big data

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<sup>5</sup> Jeni Tennison, "Why Is Open Data a Public Good?" *Open Data Institute Blog* (blog), February 25, 2015, <https://oldsite.theodi.org/blog/why-is-open-data-a-public-good>.

<sup>6</sup> Tim Davies, "Open Data, Democracy and Public Sector Reform: A Look at Open Government Data Use from data.gov.uk," August 2010, 22, <http://www.opendataimpacts.net/report/wp-content/uploads/2010/08/How-is-open-government-data-being-used-in-practice.pdf>.

<sup>7</sup> Jo Bates, "'This Is What Modern Deregulation Looks Like': Co-Optation and Contestation in the Shaping of the UK's Open Government Data Initiative," *The Journal of Community Informatics* 8, no. 2 (2012), <http://ci-journal.net/index.php/ciej/article/view/845>.

<sup>8</sup> Karl Marx, *Capital: A Critique of Political Economy, Volume 1* (London, UK: Penguin, 1991), 283–92.

<sup>9</sup> Paul Mason, *Postcapitalism: A Guide to Our Future* (London, UK: Allen Lane, 2015), 167-71.

<sup>10</sup> Ursula Huws, "The Underpinnings of Class in the Digital Age: Living, Labour and Value," *Socialist Register* 50 (2013): 84, <https://socialistregister.com/index.php/srv/article/view/20193>.

curation and value, with a view to determining other means which might be applicable in the field of open government data. Specifically, I discuss whether the concept of enclosure, the passage of the means of production from public to private hands, is a useful one, and argue that a form of “non-rivalrous” enclosure is necessary for capital accumulation to occur from open government data.

## OPEN GOVERNMENT DATA: A CRITICAL APPROACH

The concept of openness has its roots in, and is still related to, the idea of a citizen’s rights to information from the government under which they live. Until the late 20<sup>th</sup> century, arguments for openness were made on the basis of strengthening the rule of law and government accountability, albeit within the framework of societies which were hardly fully democratic.<sup>11</sup> In the late 20<sup>th</sup> century the concept of openness was given further importance by the emergence of thinking which related it to citizen participation in government decision-making, and stakeholder democracy. From 1980 onwards, the number of countries around the world adopting some sort of access to information legislation grew exponentially.<sup>12</sup>

In the UK, governments since the 1960s have to varying degrees attempted to attack cultures of secrecy in their own departments and foster openness, although the development of this trend has been uneven. The Blair and Brown Labor governments between 1997 and 2010 oversaw a number of significant developments in open government. The Freedom of Information Act came fully into force in 2005, as did the EU’s directive on the Re-use of Public Sector Information, which required governments to make available registers of their information assets.<sup>13</sup> The first major releases of registers of information occurred during the final term of the Blair-Brown Labor governments. Open data advocate Tim Berners Lee was appointed a government information adviser in 2009, and the UK government’s open data portal, data.gov.uk, was launched in January 2010.<sup>14</sup> The Conservative-Liberal Democrat coalition government which was in office between May 2010 and May 2015 embraced a “transparency agenda” which included the opening up of more government data to the public. The Freedom of Information Act was amended to enshrine the “right to data” in law. The idea was to create, in Prime Minister David Cameron’s words, an “army of effective armchair auditors” who would be able to

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<sup>11</sup> Jonathan Gray and Helen Darbishire, “Beyond Access: Open Government Data & the Right to (Re)Use Public Information,” SSRN Scholarly Paper (Rochester, NY: Social Science Research Network, January 7, 2011), 57, <https://papers.ssrn.com/abstract=2586400>.

<sup>12</sup> *Ibid.*, 61.

<sup>13</sup> Davies, “Open Data, Democracy and Public Sector Reform: A Look at Open Government Data Use from data.gov.uk,” 10; Gray and Darbishire, “Beyond Access,” 15–16.

<sup>14</sup> Bates, “This Is What Modern Deregulation Looks Like.”

scrutinize the behavior of Whitehall departments which had traditionally tended toward secrecy in their operations, despite the efforts of various governments since those of Harold Wilson in the 1960s to combat such an organizational culture.<sup>15</sup> From this brief chronological sketch it can be concluded that openness has been increasingly embraced by governments in the UK in recent decades, becoming itself a central concept in modern governance.

It is important to note, however, that the development towards openness on the part of government has been neither linear nor natural and has often been driven from outside government by communities of activists and advocates. Advocates for non-proprietary software, the code for which is made readily available for reuse (known as open source software) have long been among its champions in civil society. Following on from the open source movement, openness became an important concept in other areas, including open knowledge, open education, open government, and open data.<sup>16</sup> Tim Berners-Lee described 2010 as “the year open data went worldwide,” due to a proliferation of civic technologies that use data to increase citizens’ engagement with the world around them, and other apps making use of open government datasets, including the “mashing up” of more than one dataset and the use of data visualization to make information readily available and easily accessible. Berners-Lee cited examples such as OpenStreetMap which enabled refugee camps to be located after the 2010 earthquake in Haiti, and “Where Does My Money Go?” which visualized UK government spending data.<sup>17</sup>

The relationship between these government and non-government actors has driven the openness agenda; it has not simply emerged as a natural phenomenon or as a function of new technology. In relation to the release of public sector information and government data, scholars often talk of an open data “movement” made up of activists, journalists, policy makers, and civil society actors, which exists both inside and outside government.<sup>18</sup> Other non-governmental organizations such as the Open Data Institute have produced “roadmaps” for national governments to follow with the goal of opening

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<sup>15</sup> Tom McClean, “Not with a Bang but a Whimper: The Politics of Accountability and Open Data in the UK” (American Political Science Association 2011 Annual Meeting, Seattle, WA, 2011), 1–7, <https://papers.ssrn.com/abstract=1899790>.

<sup>16</sup> Tim G. Davies and Zainab Ashraf Bawa, “The Promises and Perils of Open Government Data (OGD),” *The Journal of Community Informatics* 8, no. 2 (2012), <http://www.ci-journal.net/index.php/ciej/article/view/929>.

<sup>17</sup> Tim Berners-Lee, “The Year Open Data Went Worldwide” (TED2010: What the World Needs Now..., February 2010), [https://www.ted.com/talks/tim\\_berniers\\_lee\\_the\\_year\\_open\\_data\\_went\\_worldwide](https://www.ted.com/talks/tim_berniers_lee_the_year_open_data_went_worldwide).

<sup>18</sup> Stefan Baack, “Datafication and Empowerment: How the Open Data Movement Re-Articulates Notions of Democracy, Participation, and Journalism,” *Big Data & Society* 2, no. 2 (December 1, 2015): 1–11, <https://doi.org/10.1177/2053951715594634>.

their data to public use. The ODI roadmap for the UK in 2015 urged the appointment of a Chief Data Officer in the Cabinet Office, and incentivization for government departments to reuse open data as well as simply producing it.<sup>19</sup> At its simplest expression, the main demand of the open data movement is for “raw data now,” as expressed by Tim Berners-Lee during a TEDtalk in 2009.<sup>20</sup> This simply means governments and other public bodies should release as much data as possible as early as possible, without necessarily waiting for projects to be completed, because the public, as taxpayers, have already in effect “paid for” the data. Government departments are encouraged by open data advocates to proactively release data regardless of whether it has been specifically requested.

Proponents of open data ascribe to it a wide variety of uses and benefits, both social and economic. Indeed, some have critically commented on the sheer range of potential benefits ascribed to open data and the expectation placed upon it as a panacea for dealing with all manner of social and economic ills. Sean Maguire, for example, states that “What began as a geek-culture advocacy drive is now seen as a technical salve for the inefficiencies of government, an incubator of app-building economic dynamism, and a caustic spotlighting of waste, mismanagement and fraud.”<sup>21</sup> For Rob Kitchin, there are five main benefits of open data: it improves accountability, allowing the success of services to be easily measured; it enables citizens to make better choices and thus creates a more informed population; it improves efficiency of services through ease of monitoring; it builds brands and enhances public trust in organizations; and it produces economic value and creates new markets.<sup>22</sup> Fatemeh Ahmadi Zeleti has focused on the economic value of open government data by its use in the production of value-added products and services, and the revenue and rent potentially generated by its use for commercial businesses.<sup>23</sup>

If open data is any data that is available, usable, and re-usable by all, then open government data is that portion of open data which is produced and released by governments, in line with the openness agenda. By and large, this data comprises information from government records, created by various departments and agencies as

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<sup>19</sup> Open Data Institute, “Open Data Roadmap for the UK 2015” (London, UK: Open Data Institute, December 8, 2014), 9–11, <https://theodi.org/article/open-data-roadmap-for-the-uk-2015/>.

<sup>20</sup> Tim Berners-Lee, “The next Web” (TED2009: The Great Unveiling, February 2009), [https://www.ted.com/talks/tim\\_berniers\\_lee\\_on\\_the\\_next\\_web?language=en](https://www.ted.com/talks/tim_berniers_lee_on_the_next_web?language=en).

<sup>21</sup> Sean Maguire, “Can Data Deliver Better Government?” *The Political Quarterly* 82, no. 4 (2011): 522, <https://doi.org/10.1111/j.1467-923X.2011.02249.x>.

<sup>22</sup> Rob Kitchin, *The Data Revolution: Big Data, Open Data, Data Infrastructures and Their Consequences* (Thousand Oaks, CA: SAGE Publications, 2014), 53.

<sup>23</sup> Fatemeh Ahmadi Zeleti, Adegboyega Ojo, and Edward Curry, “Exploring the Economic Value of Open Government Data,” *Government Information Quarterly*, Open and Smart Governments: Strategies, Tools, and Experiences, 33, no. 3 (July 1, 2016): 535–51, <https://doi.org/10.1016/j.giq.2016.01.008>.

part of their day-to-day functioning, in other words, as a result of the labor processes that take place within these departments. The data contained in those records can therefore only be as complete and reliable as the record-keeping practices of the relevant government departments allow it to be.<sup>24</sup> Erik Borglund and Tove Engvall have found that in open data discourse, the terms “information” and “data” are both often used as synonyms for “records.”<sup>25</sup> Léveillé and Timms define datasets as records, and ascribe to record-keeping professionals, acting under instruction from a records authority, the task of defining which controls must be placed on released versions.<sup>26</sup> Anne Thurston maintains a distinction between data and records, but argues that government data comes directly from government records, and through its extraction from such records it is separated from the context of its creation. This leads to concerns about its completeness and reliability, which are sometimes forgotten by enthusiastic advocates.<sup>27</sup> The labor processes involved in the production and reuse of open government data therefore include those involved in the production of the government records from which the data is extracted.

Despite the enthusiasm and advocacy of the open data movement, the concept of open data itself has not emerged wholly free of criticism. Criticisms have tended to focus on two areas. Firstly, a major critique of open government data is that it is helping to drive the neoliberal restructuring of the economy. Neoliberalism in this context is taken to mean a general shifting of power and economic resources from the public to the private sector, through methods such as privatization, outsourcing and the extension of capitalist market economics into new areas.<sup>28</sup> Jo Bates’s article “This is What Modern Deregulation Looks Like” is titled after a comment made by Francis Maude, a minister in the UK’s 2010-15 Coalition Government, regarding open government data. She argues that neo-liberalization from the 1980s onwards encouraged public bodies to see the information they created and held as a valuable, potentially revenue-generating asset. In the first instance, the introduction of internal markets in the public sector, whereby public bodies were compelled to buy and sell goods and services to each other, led to the trading of public sector information between these bodies. From this, a move towards

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<sup>24</sup> Davies and Bawa, “The Promises and Perils of Open Government Data (OGD).”

<sup>25</sup> Erik Borglund and Tove Engvall, “Open Data?: Data, Information, Document or Record?,” *Records Management Journal* 24, no. 2 (July 15, 2014): 170–74, <https://doi.org/10.1108/RMJ-01-2014-0012>.

<sup>26</sup> Valerie Léveillé and Katherine Timms, “Through a Records Management Lens: Creating a Framework for Trust in Open Government and Open Government Information,” *Canadian Journal of Information and Library Science* 39, no. 2 (2015): 175–78.

<sup>27</sup> Anne Catherine Thurston, “Trustworthy Records and Open Data,” *The Journal of Community Informatics* 8, no. 2 (2012), <http://www.ci-journal.net/index.php/ciej/article/view/951>.

<sup>28</sup> Jamie Peck, *Constructions of Neoliberal Reason*, Reprint edition (Oxford, UK: Oxford University Press, 2013), 9.

encouraging private sector use and reuse of public sector information occurred, associated with the general neoliberal movement towards the state commissioning the private sector to run services rather than running them directly. Bates found in her interviews with government workers and civil society actors that many were worried about the possibility of open government data being appropriated by commercial ventures into closed proprietary systems.<sup>29</sup>

Secondly, open data can be further critiqued in terms of usability. While open government datasets are theoretically eligible to be used by all, the presentation of raw and unstructured data requires skills and technical ability to be usable. Davies and Frank point out that government datasets do not emerge ready made for release into the public domain, but are constructed by labor, and often only as a by-product of an everyday activity rather than a designed end in themselves.<sup>30</sup> In order for them to be understood, labor processes must be applied to them and capital must be invested in their interpretation. Data's quantity, as well as its ubiquitous and complex nature, has reached a point where citizens who are informed and educated in other aspects of social life can neither understand nor interpret it.<sup>31</sup> Michael Gurstein argues that the "digital divide" which exists in modern society, whereby access to the internet dictates to a degree the material conditions, choices, and life chances available to people, could be replicated by a "data divide" because lack of income, education and technical literacy all affect the ability of individuals to actually use open data. This in turn leads to a situation where:

In fact, the most likely immediate beneficiaries of open data are those with the most resources to make effective use of the data – the private sector who have the means and the interest in directly translating available data into new commercial products, or services or marketing strategies.<sup>32</sup>

These existing criticisms both in some way directly relate to this study because they point to the relative ease by which those with access to both capital and skilled labor can begin to use open government data in a process of capital accumulation, compared to the difficulty faced by citizens without access to such capital or labor.

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<sup>29</sup> Bates, "This Is What Modern Deregulation Looks Like."

<sup>30</sup> Tim Davies and Mark Frank, "There's No Such Thing as Raw Data': Exploring the Socio-Technical Life of a Government Dataset," in *WebSci '13: Proceedings of the 5th Annual ACM Web Science Conference* (5th Annual ACM Web Science Conference, Paris, France: ACM, 2013), 75–78, <https://doi.org/10.1145/2464464.2464472>.

<sup>31</sup> Geoffrey C. Bowker, "Data Flakes: An Afterword to 'Raw Data' Is an Oxymoron," in *"Raw Data" Is an Oxymoron*, ed. Lisa Gitelman (Cambridge, MA: The MIT Press, 2013), 169–70.

<sup>32</sup> Michael B. Gurstein, "Open Data: Empowering the Empowered or Effective Data Use for Everyone?" *First Monday* 16, no. 2 (January 23, 2011), <https://doi.org/10.5210/fm.v16i2.3316>.

## THE LABOR THEORY OF VALUE

In its simplest expression, the labor theory of value states that the value of a commodity is determined by the amount of labor power, measured in labor time, which is involved in the production of the commodity. “Value” as defined in the labor theory is therefore distinct from “price,” although the two are related. It is also a precise concept distinct from other forms of value a product may possess, for example its “use value” (utility), sentimental value, or social value.

Although most closely associated with the work of Karl Marx, the idea of labor as the main determinant of value can be traced back to earlier thinkers. The 18<sup>th</sup> century French Physiocrats developed the idea that labor power creates value, but solely in relation to agricultural labor. It alone, they argued, was the productive labor of their day, which created the wealth of society. Industrial labor was merely an unproductive outgrowth of this because, unlike the agricultural worker who increased the volume of raw material, the industrial worker merely altered its form.<sup>33</sup> The Physiocrats were followed by the classical economists, notably Adam Smith and David Ricardo, who were the first to formulate the labor theory in more general terms. Smith argued that it was the ability to purchase the labor power of others that enabled some people to begin to accumulate capital, since this labor power produced value in the saleable goods produced by it, over which the purchaser of the labor power retained ownership.<sup>34</sup> For Ricardo, labor determined value in tandem with the scarcity of the resources which went into producing a good.<sup>35</sup>

In the mid-19<sup>th</sup> century, Marx developed the labor theory of value much further. He began by defining capitalist society as an “immense collection of commodities.”<sup>36</sup> A commodity is anything, a good or a service, which is produced for the purpose of exchange, in order to meet some social need. The labor power that is involved in producing a commodity must be a fraction of the total labor power which exists in society.<sup>37</sup> If something is produced to meet a need, but is not produced for exchange on a market, it is a “use-value” but not a commodity. A use-value is merely the usefulness of a produced thing in the course of human life.<sup>38</sup> For example, a chair made by an individual who desires to sit on it in their own home is merely a use-value, but a chair produced in a factory to be sold on a market for use in wider society is a commodity, because it is produced for exchange. The value of a commodity is determined by the labor power

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<sup>33</sup> See Karl Marx, *Theories of Surplus Value* (London, UK: Lawrence and Wishart, 1951), 44–57.

<sup>34</sup> Albert C. Whitaker, *History and Criticism of the Labour Theory of Value in English Political Economy* (Kitchener, Ontario: Batoche, 2001), 9–10.

<sup>35</sup> Whitaker, 24–25.

<sup>36</sup> Marx, *Capital: A Critique of Political Economy, Volume 1*, 125.

<sup>37</sup> Karl Marx, *Wages, Price, and Profit* (Beijing, China: Foreign Language Press, 1970), 34.

<sup>38</sup> Marx, *Capital*, 125–28.

which it is necessary, on average, to expend in its production, measured in units of time. This includes the value of all instruments of production and raw materials which have been involved in its production, also measured in labor time. Raw materials are entirely perishable and rivalrous; for example, a quantity of wood used in the production of a chair cannot be simultaneously used in the production of a table; it is entirely consumed in the process of producing the chair. As a result, the entire labor value involved in the extraction of raw materials is transferred to the value of the commodity which is produced using them. By contrast, instruments of production may be used in the production of many commodities before they wear out. For example, a hammer may be used to make ten thousand chairs before it becomes unusable. In this case, only one-ten-thousandth of the labor value of the hammer would be transferred to the value of each chair.<sup>39</sup> Marx expanded this latter point in his discussion on machines, which will be considered below.

Secondly, Marx recognized that labor power is itself a commodity. Labor power is taken to a “labor market” to be sold by workers and bought by capitalists. Like any other commodity, its value is determined by the amount of labor power that is necessary to produce it.<sup>40</sup> This labor is variously termed reproductive or unproductive labor by different authors.<sup>41</sup> It includes labor which is necessary to reproduce the physical and mental conditions under which a worker must live in order to continue selling their labor power to a capitalist, for example cooking and eating food. This is not merely determined by bare necessities of surviving, but also by the customary standards of living in a given society:

Besides the mere physical element, the value of labor is in every country determined by a traditional standard of life. It is not mere physical life, but it is the satisfaction of certain wants springing from the social conditions in which people are placed and reared up.<sup>42</sup>

By this definition, reproductive labor also includes labor power expended in ensuring that workers possess the adequate and correct skills, such as work in the education system and training. In the modern world, much of the work that takes place in the public sector is reproductive, since it does not directly produce profit but goes towards the reproduction of the social conditions necessary for the system of capital accumulation to sustain itself.

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<sup>39</sup> Marx, *Wages, Price, and Profit*, 36–37.

<sup>40</sup> *Ibid.*, 44–45.

<sup>41</sup> Huws, “The Underpinnings of Class in the Digital Age,” 93. I use the term “reproductive labor” for the sake of simplicity, and because “unproductive labor” can have its meaning confused by general discussions of productivity in mainstream economics.

<sup>42</sup> Marx, *Wages, Price, and Profit*, 72.

The key distinction between productive and reproductive labor in capitalist society is, according to Marx, whether or not the labor power expended directly contributes to capital accumulation, through the production of commodities for the purpose of exchange.<sup>43</sup> Reproductive labor does not produce a direct surplus, whereas productive labor does. Capital accumulation occurs in this process from the generation of surplus value.

Surplus value is created during the portion of the working day in which the worker is undertaking uncompensated labor for the capitalist. Marx argues that if it takes six hours of reproductive labor time to provide a worker with the conditions necessary to live, a capitalist will pay them for those six hours at the current value of six hours' labor time. However, it is likely that the worker will be required to work an eight-hour day, or longer, as part of their contract with the employer. In this case, they would be performing two hours of uncompensated labor, which Marx terms surplus labor, for the employer.<sup>44</sup> This is the labor time during which surplus value is produced – the entire value of what the worker produces during this time is appropriated by the capitalist, and constitutes the profit for the capitalist when it is realized through the exchange of the commodity on a market for money. Note that Marx distinguishes sharply between value and price. Marx follows Adam Smith in arguing that forces of supply and demand act upon commodities to determine their price at a given time. However, the average price will tend back towards the value as determined by labor power.<sup>45</sup>

Surplus value is broken down by Marx into three categories: rent, interest, and profit. It is only profit which will concern us in this study, since only profit is appropriated directly by the employing capitalist.<sup>46</sup> The concept of rent has, however, been used in recent theoretical discussions about big data and the creation of value, as will be mentioned below.

Before applying the labor theory to data curation processes, it is necessary to examine how it has dealt with the question of automation. The automation of production processes increases surplus value because it increases the ratio of surplus labor compared to necessary labor:

Capital employs machinery... only to the extent that it enables the worker to work a larger part of his time for capital, to relate to a larger part of his time as time which does not belong to him, to work longer for another.<sup>47</sup>

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<sup>43</sup> Marx, *Capital*, 1038–48.

<sup>44</sup> Marx, *Wages, Price, and Profit*, 47–49.

<sup>45</sup> *Ibid.*, 40.

<sup>46</sup> *Ibid.*, 55.

<sup>47</sup> Karl Marx, *Grundrisse: Foundations of the Critique of Political Economy*, trans. Martin Nicolaus, Reprint edition (London, UK: Penguin, 1973), 701.

In a passage in the *Grundrisse* which has come to be known as the “Fragment on Machines,” Marx expanded on this idea with reference to the increasingly automated production processes of his day. In an automated work process, the skill of workers is less and less directly applied to raw materials to create a commodity and is more and more replaced by the skill of machines. Workers become only “conscious linkages” in a process dominated by machines.<sup>48</sup> Machinery transfers a fraction of its own value to the value of the final product, in the same way as the example of the hammer above, but at a fraction of the rate because it can be used in the production of exponentially more commodities than a hand-wielded tool of production.<sup>49</sup> For Marx, therefore, a general improvement in the productive power of labor, which leads to less labor time being required for the production of a commodity, will decrease the value of each individual commodity. This “tendency of the rate of profit to fall” takes on a special significance with regards to information goods.<sup>50</sup>

A number of definitions for information goods have been advanced in the last twenty years or so as they have become more prevalent in society. In 1998, Hal Varian described an information good as “anything that can be digitized” and noted that they are often non-rivalrous, meaning that their consumption by one person does not diminish the amount available for consumption by others. However, he noted that the information contained in the good is often “bundled” with the physical form necessary to access it, which can only be accessed by a limited number of consumers at any time: a book or a CD, for example.<sup>51</sup> More recently, Yochai Benkler has reiterated the non-rivalrous nature of information goods.<sup>52</sup> Frank Linde and Wolfgang Stock refined this definition to include the idea that an information good must have a use value to economic actors, so unwanted information in the form, for example, of a TV advert, would not be included in the definition.<sup>53</sup> For Paul Mason, following Paul Romer, this use value is essentially that an information good acts as a set of instructions for accessing or creating something else.<sup>54</sup> A piece of software, a file which enables an audio track to be played, or a written set of instructions for the use of a household object are all examples of this. Information goods

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<sup>48</sup> Ibid., 692–93.

<sup>49</sup> Ibid., 701.

<sup>50</sup> Mason, *Postcapitalism*, 167–71.

<sup>51</sup> Hal R. Varian, “Markets for Information Goods” (Monetary Policy in a World of Knowledge-based Growth: Quality Change, and Uncertain Measurement, Tokyo, Japan: Bank of Japan - Institute for Monetary and Economic Studies, 1998), <http://people.ischool.berkeley.edu/~hal/Papers/japan/index.html>.

<sup>52</sup> Yochai Benkler, *The Wealth of Networks: How Social Production Transforms Markets and Freedom* (New Haven, CT: Yale University Press, 2007), 37.

<sup>53</sup> Frank Linde and Wolfgang G. Stock, *Information Markets: A Strategic Guideline for the i-Commerce* (Berlin, New York: De Gruyter, 2011), 24.

<sup>54</sup> Mason, *Postcapitalism*, 116–17.

are therefore goods which derive their economic use value primarily from the information contained within them.

Another element of information goods, at least those that are produced digitally, is that their marginal cost – that is, the cost of producing more than one copy of the good – is very low. Although the fixed cost of producing the original good may be high, due to the skilled labor often involved, the good can then be easily copied, for example through copying and pasting.<sup>55</sup> Benkler has noted that the costs of production and distribution of information goods in the digital age tend to be low, particularly when compared with, for example, the amount of capital investment needed in the production and distribution of 20<sup>th</sup> century information goods such as newspapers.<sup>56</sup> According to Jeremy Rifkin, the advent of the internet in particular has “brought the marginal cost of securing information to near zero.”<sup>57</sup> The value of the labor required to produce the original good is therefore fractionally transferred to each copy, in a similar manner to how Marx sees the value of machinery transferring to finished products. This means that, according to the labor theory, the value of information goods diminishes as more are produced. Paul Mason argues that this is a key reason behind capital’s attempt to capture more socially produced data in the form of big data produced by consumers.<sup>58</sup> It is also a reason behind capital’s support for open government data, which it can enclose in the manner discussed below.

According to the definitions outlined above, datasets are information goods. They are primarily used for the information they contain, are non-rivalrous, and have a marginal cost of reproduction that tends towards zero. We must keep this in mind as we examine the application of the labor theory to data curation.

## APPLYING THE LABOR THEORY TO DIGITAL CURATION

Inasmuch as the labor theory of value has been applied to data curation, it has emerged in the context of the discussion about the production and use of big data by large commercial enterprises, particularly Web 2.0 and social media companies including Facebook and Google. A review of this literature follows, with a view to extracting any theoretical points relevant to a discussion in relation to open government data.

This literature has largely been inspired by Marxist and post-Marxist theory, or a combination of the two. There are significant disagreements about how the value of big

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<sup>55</sup> Ibid., 117.

<sup>56</sup> Benkler, *The Wealth of Networks*, 51–52.

<sup>57</sup> Jeremy Rifkin, *The Zero Marginal Cost Society: The Internet of Things, the Collaborative Commons, and the Eclipse of Capitalism*, Reprint edition (New York, NY: St. Martin’s Griffin, 2015), 166–67.

<sup>58</sup> Mason, *Postcapitalism*, 143.

data is produced and realized. Christian Fuchs argues that, as users of Web 2.0 platforms are constantly providing data to the corporations that run them, and this data is later used to generate profits, users are essentially performing unpaid labor, and that time spent browsing, liking and sharing on the internet should be treated as surplus labor.<sup>59</sup> This builds on the idea of “prosumers,” groups or individuals who are at once producers and consumers, co-creating products of value on the internet (in this case, data).

Fuchs has been critiqued from various quarters. Adam Arvidsson and Elanor Colleoni argue that Fuchs misapplies the labor theory of value to data creation, and that it is not primarily the uncompensated labor time of prosumers that creates surplus value in this field. They point out that a division of Facebook’s profits between all its users would result in each prosumer receiving \$0.70 per annum, which hardly indicates a significant exploitation of labor time. Rather, it is prosumers’ networks of affective relationships from which value is extracted, and Arvidsson and Colleoni posit that quantitative analyses of big data will show links between “online sentiment and reputation” and the valuation of companies.<sup>60</sup> Bruce Robinson agrees in part with Arvidsson and Colleoni’s criticisms of Fuchs, but argues that user-generated data is not itself primarily a commodity, but rather is used, through contributing to targeted internet advertising and the like, to improve the circulation of other commodities and better realize their value on the market. According to Robinson, the primary role of big data in value creation is therefore to realize value created by commodity production in other sectors of the economy.<sup>61</sup> Ursula Huws agrees that such value produced from big data is essentially realized through the sale of advertising space, which constitutes the business model of large Web 2.0 companies like Facebook.<sup>62</sup> Surplus value so realized would fall into the category of rent, rather than a directly extracted surplus, following the distinctions outlined by Marx as described above. It is still the product of uncompensated labor time from workforces involved in the production of commodities in the “real economy,” rather than value created by online “prosumers” themselves.

This leaves us in need of an answer to the question of the nature of the labor power being applied in the creation, management, and manipulation of data, in order to

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<sup>59</sup> Christian Fuchs, “Labor in Informational Capitalism and on the Internet,” *The Information Society* 26, no. 3 (May 2010): 191–92, <https://doi.org/10.1080/01972241003712215>.

<sup>60</sup> Adam Arvidsson and Elanor Colleoni, “Value in Informational Capitalism and on the Internet,” *The Information Society* 28, no. 3 (May 1, 2012): 138–47, <https://doi.org/10.1080/01972243.2012.669449>.

<sup>61</sup> Bruce Robinson, “With a Different Marx: Value and the Contradictions of Web 2.0 Capitalism,” *The Information Society* 31, no. 1 (January 1, 2015): 46–48, <https://doi.org/10.1080/01972243.2015.977634>.

<sup>62</sup> Ursula Huws, “The Underpinnings of Class in the Digital Age: Living, Labour and Value,” *Socialist Register* 50 (2013): 96, <https://socialistregister.com/index.php/srv/article/view/20193>.

determine whether or not these processes create surplus value. In her analysis of class in a digital economy, Ursula Huws develops a schema of four types of labor, based on whether the labor is paid or unpaid, and whether it is productive or reproductive:

- Type A: Reproductive paid labor
- Type B: Reproductive unpaid labor
- Type C: Directly productive paid labor
- Type D: Directly productive unpaid labor

Of these, only Type C, which is labor engaged in commodity production, is, in Huws' words, "inside the knot" of Marx's labor theory of value, directly producing surplus value for a capitalist.<sup>63</sup> Other categories of labor are ultimately reliant on directly productive paid labor, as all of them make use of commodities that have somewhere been produced by it. Labor power can shift between these four types depending on the social conditions under which it is performed. For example, the privatization of public services can shift work from Type A to Type C, as services become a commodity to be exchanged on a market. The emergence of prosumer work, including the kind of labor Fuchs talks about in relation to data, is potentially a shift from Type C to Type D, because it involves consumers carrying out tasks which were previously done by productive, paid staff.<sup>64</sup> Examples of this might include the use of self-service supermarket checkouts, or filling in and uploading a self-assessment tax form.

## ENCLOSURE AND CAPITAL ACCUMULATION

Capital accumulation does not only take place through the extraction of surplus value during the labor process. Throughout history there have been, to a greater or lesser degree, examples of direct appropriation, whereby raw materials and instruments of production which were previously held publicly, or in common, have been given over to private enterprise. This process has historically been called enclosure, a term which has been most frequently applied to the practice in England, from the 15<sup>th</sup> century onwards, of transforming common land into the private property of landowners through means of state enforcement by Acts of Parliament.<sup>65</sup> Enclosure extended market relations into economic areas which had hitherto been dominated by common ownership. In so doing, it allowed the process of capital accumulation to begin or to gather pace, since it placed the means of production in the hands of private capital. In feudal England, land was the

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<sup>63</sup> Huws, 84.

<sup>64</sup> Ibid.

<sup>65</sup> E. P. Thompson, *Customs in Common: Studies in Traditional Popular Culture* (New York: The New Press, 1993), 84.

major means of production. Under industrial capitalism, fixed capital in the form of plant and machinery, in addition to land, form the means of production. In 1993, Peter Drucker argued that information was superseding these as the major means of production under late capitalism.<sup>66</sup> Whether or not capitalist means of production are undergoing, or have undergone, quite such a fundamental shift is a debate outside the scope of this study. It cannot be denied, however, that information has emerged as a major element in the means of production.<sup>67</sup> This takes the form of hardware and software, and the ever increasingly complex sets of instructions which imbue all stages of the production process, particularly in automated production.<sup>68</sup>

## THE ENCLOSURE OF DATA

It is therefore pertinent to ask whether or not information has been, or can be, enclosed in the manner of previous means of production such as land, because this may have implications for how forms of information such as structured data are used in capital accumulation. In the early 2000s, James Boyle argued that the digital world had witnessed the emergence of a “second enclosure movement.” This involved turning commonly-developed and commonly-owned digital assets into private property. Just as with the original enclosure movement, Boyle argued, this had been done by the state actively extending private property rights – in this case intellectual property (IP) rights – into areas where they had hitherto been regarded as irrelevant, or wrong. This even went as far as extending IP rights over “mere compilations of facts.”<sup>69</sup> Others took Boyle’s ideas further. Lawrence Lessig, while agreeing with the idea of IP rights, criticized their encroachment, with the advent of the internet, into “the ordinary ways in which individuals create and share culture.”<sup>70</sup>

Intellectual property rights militate against the intrinsic non-rivalrous nature of information goods by allowing capital to exclude people from using them. But can open government data be subject to a form of enclosure? At first this question seems counter-intuitive for two main reasons. Firstly, the extension of the concept of enclosure from a

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<sup>66</sup> Mason, *Postcapitalism*, 112–13.

<sup>67</sup> Serhat Kolođlugil, “Digitizing Karl Marx: The New Political Economy of General Intellect and Immaterial Labor,” *Rethinking Marxism* 27, no. 1 (January 2, 2015): 123–24, <https://doi.org/10.1080/08935696.2014.980678>.

<sup>68</sup> Mason, *Postcapitalism*, 109–11.

<sup>69</sup> James Boyle, “The Second Enclosure Movement and the Construction of the Public Domain,” *Law and Contemporary Problems* 66, no. 1 (April 1, 2003): 35–39.

<sup>70</sup> Lawrence Lessig, *Free Culture: How Big Media Uses Technology and the Law to Lock Down Culture and Control Creativity* (Penguin, 2004), 8–9.

strictly territorial one has been criticized by some geographers as ill-defined.<sup>71</sup> Data does not exist in a geographical place which can be enclosed. Secondly, capital is broadly in favor of the opening up of government data, as evidence for example by the role of many Web 2.0 giants in campaigning against the Stop Online Piracy Act (SOPA) in the USA in 2012.<sup>72</sup> Benkler argued that as information goods are produced from other information goods, it is in the interests of producers to champion openness in order to lower the costs of production. This point was also made by Boyle who said that enclosure in the case of information goods may actually harm innovation.<sup>73</sup> For example, in the case of the UK Land Registry's database of prices paid for properties private capital has been opposed to the selling off of the data into private hands. This is because such a sale would hamper its use in the production of new products across the emerging "property technology" sector, which mashes up the data with proprietary datasets to create tools to improve the efficiency of housing market transactions.<sup>74</sup>

However, each of these objections to applying the concept of enclosure to data can be challenged. Firstly, while data does not have a geographical location, it is most certainly property. Even open government data is a form of property subject to IP laws and licensing which govern the nature of its release and use.<sup>75</sup> Even if this property is socially produced or owned, it still exists in a capitalist framework and is therefore at risk of being encroached upon, and subsumed by, capital. Ishmael Burdeau argues that the more the bulk of information is made available online, the more this "signals a seismic shift toward a homogeneous and universal pool of information, one at risk of new forms of restriction and enclosure, akin to other forms of commons found in earlier periods of our history."<sup>76</sup>

Secondly, openness is, at least in some sense, relative. In theory open government data is equally available to all, but as it is currently released in the UK and

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<sup>71</sup> For example, see Alvaro Sevilla-Buitrago, "Capitalist Formations of Enclosure: Space and the Extinction of the Commons," *Antipode* 47, no. 4 (2015): 1000–1002, <https://doi.org/10.1111/anti.12143>.

<sup>72</sup> Fenwick McKelvey, "Openness Compromised? Questioning the Role of Openness in Digital Methods and Contemporary Critical Praxis," in *Compromised Data: From Social Media to Big Data*, ed. Greg Elmer, Ganaele Langlois, and Joanna Redden (New York: Bloomsbury Academic, 2015), 139.

<sup>73</sup> Benkler, *The Wealth of Networks*, 38; Boyle, "The Second Enclosure Movement and the Construction of the Public Domain," 43–44.

<sup>74</sup> Becky Hogge, "Open Data: Six Stories About Impact in the UK" (London, UK: Omidyar Network, November 2015), 18.

<sup>75</sup> Christine L. Borgman, *Big Data, Little Data, No Data: Scholarship in the Networked World* (Cambridge, MA: The MIT Press, 2015), 75.

<sup>76</sup> Ishmael Burdeau, "The Last Great Enclosure: The Crisis of the General Intellect," *Journal of Labor and Society* 18, no. 4 (2015): 655–56, <https://doi.org/10.1111/wusa.12217>.

USA, much of it is in formats difficult for the private citizen to understand and make usable for their own purposes. One recent study found that a majority of citizens questioned found open data difficult to interpret due to the fact that much of it is released in forms which lack enough structure and metadata, and only a small minority thought that governments made tools or training available to assist in understanding the information contained in the data.<sup>77</sup> A browse through the datasets available on data.gov.uk reveals descriptions heavily laden with jargon, file extensions unfamiliar to most potential users such as .json, and datasets made available with little or no accompanying metadata.<sup>78</sup> In practice those with the necessary skills and technical capacity to make the data usable have greater access to it. Outside of the government departments which release the data, these are most likely to be capitalist enterprises. For Christine Borgman, the implication of this is that research data is in fact rivalrous, as its usability is restricted at any given time to those in possession of these necessary tools.<sup>79</sup>

Open government data is not itself rivalrous, but access and usability to it can be. This means that we can identify a peculiar form of non-rivalrous enclosure: Datasets produced as a public goods, by reproductive labor in the public sector, are released by government as open data. Capital takes possession of these datasets, an act which is a clear transfer of public goods into private hands. The non-rivalrous nature of the datasets means that this does not preclude their simultaneous use by citizens, non-profits, and other non-capitalist actors. However, an act of enclosure of some kind, of the use of publicly owned resources for capital accumulation, has taken place.

## CONCLUSION: TOWARDS A THEORETICAL FRAMEWORK

From the existing literature and concepts outlined above it is possible to develop a theoretical framework to determine whether and how open government datasets produce surplus value or contribute to capital accumulation through a process of enclosure. Firstly, it is possible to determine which types of labor are applied at each stage in the production and use of an open government dataset, and whether or not this labor is directly producing surplus value for capital, using Ursula Huws' scheme outlined above. These processes could be human, part-automated, or fully automated. Secondly, we can classify open government datasets as information goods used in the production of other

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<sup>77</sup> Vishanth Weerakkody et al., "Open Data and Its Usability: An Empirical View from the Citizen's Perspective," *Information Systems Frontiers* 19, no. 2 (April 1, 2017): 1–16, <https://doi.org/10.1007/s10796-016-9679-1>.

<sup>78</sup> See, for example, results for the "Towns and Cities" theme, <https://data.gov.uk/search?q=&filters%5Bpublisher%5D=&filters%5Btopic%5D=Towns+and+cities&filters%5Bformat%5D=&sort=best> (accessed March 10, 2019).

<sup>79</sup> Borgman, *Big Data, Little Data, No Data*, 74.

information goods. They are produced from social labor, not purely for the consumption of the producer, but they are not produced for the purpose of direct exchange on a market, so they are not commodities in a Marxist sense. Rather, they are instruments of production which may be used to create commodities, transferring their value fractionally into these finished commodities. Thirdly, open government datasets do not create value in themselves. After enclosure, they become fixed capital in the production process of dataset commodities, akin to machinery, and fixed capital does not create value by itself.<sup>80</sup> Rather, datasets as fixed capital allow new labor power to add value to the finished commodity by interacting with them. Finally, in order to become part of the means of commodity production, open government datasets must necessarily undergo a form of enclosure by capital, transferring into private hands. Traditional enclosure is an imperfect analogy for this action because of the non-rivalrous nature of the datasets but is nevertheless a useful way of conceptualizing the means by which capital uses these publicly produced instruments of production in the process of capital accumulation.

This framework can be applied to a mapping exercise of the labor processes involved in the production, curation, and use of open government datasets. Such processes may be different in each case but will necessarily include data collection, data entry, the release of data through uploading and downloading it, the mashup of different datasets, and data visualization. By identifying which of these processes constitute productive paid labor in Ursula Huws' schema, it should be possible to identify where surplus value is extracted in the course of data production. Likewise, by mapping who has custody of datasets at different points in the process, it should be possible to determine whether and at which point the enclosure of data takes place. Further study and the application of this framework in case studies will result in an understanding of the value contained in the information goods – or commodities – produced using open government datasets, thereby revealing how such datasets are used in capital accumulation.

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<sup>80</sup> Fuchs, "Labor in Informational Capitalism and on the Internet," 182–83.

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