MEASURING THE OTHER HALF: NEW MEASURES OF INTANGIBLE INVESTMENT FROM THE ONS

Josh Martin*

Only half of investment by firms is in physical capital, such as buildings and machinery. The other half is in intangible assets, such as branding, software and training. This has been true for the past two decades or more in the UK, but only if you step beyond the measures in the National Accounts, which include only some of the recognised intangible assets. This paper surveys ongoing work at the Office for National Statistics to develop measures of investment in intangible assets, using new insights and innovative approaches. In particular, this paper reviews developments in three areas: in-house branding investments, employer-funded training investments, and in-house investments in organisational capital. We reconsider some of the key assumptions made in the literature and propose alternative approaches to measurement. The paper concludes by considering implications of this work, and identifies some of the remaining gaps in the evidence base for measuring intangible assets.

Keywords: intangible assets, capital, investment, branding, marketing, organisational capital, intellectual property, training.

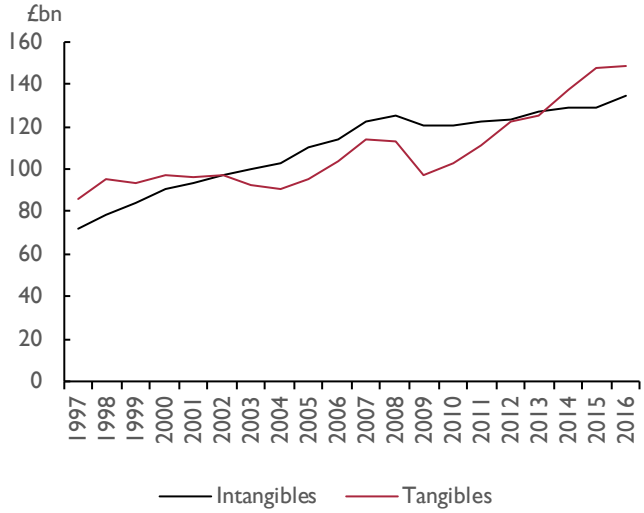
JEL codes: E22; J24; O34; M53.

Introduction

Investments in buildings, structures, transport equipment, IT hardware and other machinery make up about half of all capital expenditure by businesses in the UK. These are tangible assets – those which you can see and touch, and usually measure reasonably well. More often than not, they are bought from manufacturing companies or built by construction firms. As a result, the measurement of these investments is reasonably straightforward.

The other half of investment is in intangible assets (figure 1). Measuring these is far less straightforward, and the UK Office for National Statistics (ONS) has been improving the methods and data sources to do so in recent years, particularly in response to the Bean Review (2016). As well as providing improved estimates of investment for the UK National Accounts, and so for Gross Domestic Product (GDP), statistics on intangible investment also give important insights on innovation and productivity. In light of the long-standing productivity puzzle in the UK (the topic of a piece in the February 2019 edition of this *Review*), ONS research on intangible assets contributes to an important and wide-ranging discussion on the reasons for the slowdown.

Figure 1. Intangible and tangible investment, UK market sector, current prices



Source: Office for National Statistics.

Notes: Current prices; encompass some intangible assets not capitalised in the National Accounts; market sector is whole economy excluding industries: real estate (L), public administration and defence (O), education (P), and health and social care (Q).

*Office for National Statistics. E-mail: Josh.Martin@ons.gov.uk. The author recognises contributions from participants at the Economic Statistics Centre of Excellence (ESCoE) 2019 annual conference, and other previous ESCoE events and workshops. Research support from Sam Shilton, Matt Eddolls, and Jay Ahmed is gratefully acknowledged, as are comments on an earlier draft by Katherine Kent, Richard Heys, Joe Murphy and Rebecca Riley. Any omissions or errors are the author's responsibility. The views expressed in this paper are those of the author and not necessarily those of the ONS.

https://doi.org/10.1177/002795011924900111 Published online by Cambridge University Press

The broadly 50:50 split between tangible and intangible investment has held for the past two decades, but is only true when stepping beyond the National Accounts. While official measures of investment include software and research and development (R&D), among other smaller items, they exclude expenditure on market research, advertising, staff training, product and process design, and organisational improvements. Two ONS surveys on intangible investment found that the average business expected spending on these categories to provide returns over a multi-year period – the threshold for spending to be investment is that benefits exceed a year. Indeed, a growing body of academic literature supports the view that businesses make investments in these areas, and that firms that do so are more likely to perform well.

International guidance on national accounting has taken some steps to treat business spending on intangibles as investment – the System of National Accounts (SNA) 2008 and the European System of Accounts (ESA) 2010 both changed to treat R&D expenditure as investment. In the UK, the ONS made this change in the 2014 Blue Book (the annual comprehensive update to the National Accounts) after extensive research. The 2019 Blue Book will deliver the largest changes to intangible investment since then, improving estimates of software made in-house by businesses, and updating estimates of investment in copyrighted assets like songs, books and films.

As well as this, the ONS produces experimental statistics about the set of intangibles not treated as assets in the National Accounts. This builds on a long-series of academic work, starting with the seminal paper by Carol Corrado, Charles Hulten and Daniel Sichel for the United States in 2005. Global projects pushed this agenda forward in the subsequent decade – Coinvest (2008 to 2010), Innodrive (2008 to 2011), and Spintan (2013 to 2017). A wide range of authors and organisations contributed to this work, and we would do a disservice naming only some of them. Estimates for the UK were developed mainly by Jonathan Haskel, Peter Goodridge and Gavin Wallis, amongst others. ONS work in this area builds on this rich history, and is world-leading amongst national statistical institutes (NSIs) – few other NSIs, to the author's knowledge, have published statistics on intangible assets that go beyond the national accounting boundaries. ONS is also a recognised expert in the measurement of intangible assets within the national accounting boundaries, especially for own-account software.

This paper outlines the latest ONS research on the measurement of intangible assets in three areas: in-house branding investments, employer-funded training investments, and in-house investments in organisational capital. Each uses existing evidence from a variety of sources, as well as new research using ONS microdata. The paper concludes by setting out the implications of this work, and the remaining gaps in the evidence base for measuring intangible assets.

Own-account branding

Imagine you set up your own drinks brand – Your Name Drinks Company. Imagine you know the secret recipe[1] for the Coca Cola drink (a carbonated soft drink). You have all the right ingredients, suitable machinery, and qualified and experienced staff. You decide to manufacture some, and to your delight find it tastes exactly the same as Coca Cola. So you decide to sell it as 'Carbonated Soft Drink in a Can'. How many units do you think you would sell? Fewer than The Coca-Cola Company in all likelihood.

In this illustrative example, Your Name Drinks Company is missing only one thing compared with The Coca-Cola Company – a brand. Since its establishment in the 1890s, The Coca-Cola Company has invested relentlessly in its brand, such that it now dominates the soft drinks market. Indeed, its marketing is often credited with turning the traditional image of Father Christmas from green to red attire. It is arguably these investments that make The Coca-Cola Company so successful.

While clearly many businesses invest in their brands, measuring this presents three main challenges: there is limited evidence on what fraction of spending on branding is truly investment; it is difficult to identify which workers contribute to branding when estimating in-house investment; and there is a lack of evidence on what proportion of relevant workers' time is spent on long-lived branding activities. These are elaborated in turn.

First, identifying what fraction of expenditures are investments. Using the generally accepted definition, expenditure must yield a multi-year return to be classed as investment. Equivalently, an asset must be used continuously or repeatedly in production for a year or more. In the case of branding, its 'use in production' can mean that the investing business will benefit from it in the form of higher sales or higher prices for a year or more.

Evidence from ONS surveys of businesses in 2010 and 2012 support the view that at least some branding expenditure is investment. Responding businesses were asked to report how long they would expect to benefit on average from a range of intangible investments.

https://doi.org/10.1177/002795011924900111 Published online by Cambridge University Press

For 'reputation and branding', the mean benefit life was around three years, and higher for businesses in production industries than for those in services.

Nonetheless, determining what fraction of total spending on branding would meet the threshold for investment remains difficult. Three possible approaches are outlined below, each of which considers different dimensions of branding expenditures: regional and national; emotional and rational; and communication channel.

National advertising, which can be assumed to reach more people, could be considered long-lived, while regional advertising could be thought of as short-lived, given its limited audience. However, this does imply that businesses that only operate regionally cannot create brands, which is clearly false. In current ONS estimates of intangible investment, based on the established methodology dating back to Corrado *et al*. (2005), 40 per cent of branding spend is excluded as short-lived. This is based on a 2000 study by Robert Coen, the former director of Forecasting at the American advertising agency Universal McCann, who found that 60 per cent of advertising in the US was national, and 40 per cent was regional. Given that this assumption is twenty years old and not based on UK data, it is an apt time to review it.

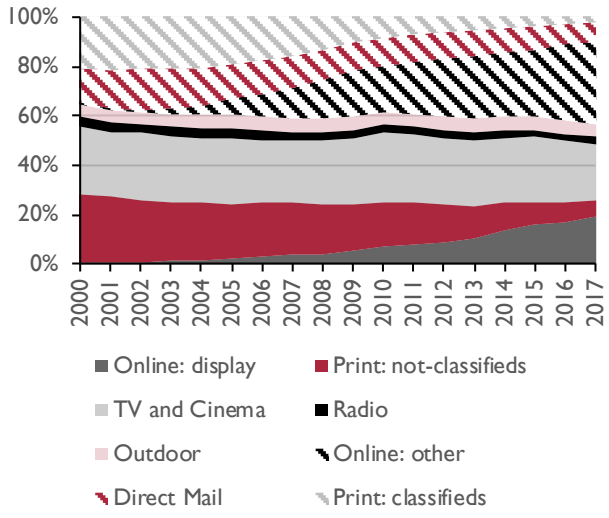
An alternative approach is to separate advertising by content. Emotional advertising[2] appeals to the subconscious, trying to create an image in the consumer's mind of the brand being inherently good. Examples of this type of advertising include the John Lewis Christmas advert, which contains little content relating to products John Lewis sell, but instead attempts to get the watcher to associate John Lewis with Christmas, creating brand loyalty. Rational advertising aims to persuade the consumer to buy a product by convincing them of its merits, without creating any loyalty to the brand. In this case, emotional advertising is more likely to be a long-lived asset, due to the creation of loyalty. However, it may not be straightforward to distinguish between these types of advertising, which makes measurement of the proportion of advertising that falls into each category difficult.

A more pragmatic solution is to examine the communication channels of advertising, some of which may be considered long-lived and others not. Advertising can be delivered through many media, including television, radio, billboards and other localised forms, online and direct mail. Consumer behaviour in relation to these, and the reach of each medium, could inform the benefit life of the advertising. The marketing literature[3] recognises two channels of advertising: branding-building, and activation (of sales). Most media can be easily categorised into either channel – direct mail and forms of sales promotion are clearly activation, while more sophisticated media tend to be brand-building. Some channels are more flexible, such as online.

In the past two decades, advertising has changed dramatically: whereas online advertising made up only 1 per cent of advertising spend in 2000, it accounted for over half in 2017. Online advertising covers a range of types: classified adverts (listings on online websites for individual items), search advertising (raising the profile of particular websites in search engine results), and display advertising (videos or images embedded into websites), amongst other smaller types. Of these, only display advertising can be expected to be long-lived, and so treating online as a heterogeneous medium is important.

Using data from WARC (World Advertising Research Centre) and the Internet Advertising Bureau on advertising spending by medium, it is possible to estimate the share that is long-lived (figure 2). If all advertising media except online search, classified adverts, and direct mail are classified as long-lived, the investment share falls slowly from around 65 per cent to 55 per cent of total advertising spending in the UK between 2000 and 2017. Using similar data from Nielsen, and making the same categorisation into the two channels, Binet and Field (2013) report a 60:40 split between brand-building

Figure 2. Advertising expenditure by medium, UK



Source: WARC, IAB, author's calculations.
Notes: Dashed areas are categorised as short-lived, solid areas are long-lived. Online: other is made mostly of 'search' and 'classifieds'. TV and Cinema category is predominantly TV.

https://doi.org/10.1177/002795011924900111 Published online by Cambridge University Press

and activation in the US, and promote this as the most efficient marketing strategy. On this basis, the previous assumption that 60 per cent of branding expenditures are long-lived seems reasonable.

The evidence for market research is more limited. On the face of it, market research would appear always to be the creation of new knowledge, such that a higher share could be considered investment. However, market research tends to precede advertising, so if some advertising does not produce multi-year benefits, then perhaps the same is true of market research. Data from ESOMAR (a trade body for market research and data analytics companies) split out spending on market research by type of research – for example, 20 per cent of spend is on market measurement, 16 per cent is on usage and attitude surveys, and so on. While most categories could be considered to lead to long-term knowledge, a conservative estimate might be that around 80 per cent is long-lived.

Turning attention to measurement, it is important to capture both purchased branding services (from specialised organisations) and in-house creation (referred to as own-account investment). Data on purchases are typically more readily available, as they are market transactions that can be tracked and recorded – data are often collected in business surveys. Own-account investment is typically poorly measured by businesses, if at all, and researchers often form their own estimates of investment by modelling the costs of production. The method recommended for own-account software by the OECD and Eurostat for national statistical institutes is as follows:

Wages and salaries of relevant workers (software professionals outside of the software producing industry, in the case of own-account software)
Multiplied by
A scale-up factor for non-wage labour costs (such as employers' national insurance and pension contributions)
Multiplied by
A scale-down factor for time spent on non-investment activities (such as training, unrelated meetings, corporate activities, and so on)
Multiplied by
A scale-up factor for non-labour costs (such as intermediate inputs, overheads, use of capital, and a mark-up for profits)
Multiplied by
A sales-adjustment factor for those industries that produce the relevant good for sale, so as to avoid double-counting with 'purchased' investments

The same can readily be applied for investments in own-account branding. In previous ONS estimates of intangible investment, based on the approach used in the academic literature, no such estimates of own-account branding were made. Instead, own-account market research was assumed to be the same in value as purchased market research, while no own-account advertising was assumed to take place. As such, the estimates in this paper are the first of their kind to the author's knowledge.

The approach generally relies on labour market data which has details of workers' occupations, industries and pay. The most suitable UK survey is the Annual Survey of Hours and Earnings (ASHE), which is a 1 per cent sample of the working UK population based on national insurance numbers. The survey is completed by employers on behalf of their sampled employees, improving the accuracy of the factual data about their job. Occupations in this dataset are recorded based on the Standard Occupation Classification (SOC), following coding by ONS from job-titles given by the employers.

The choice of these occupations can be motivated with reference to the marketing literature: marketing can be defined as a three-stage process involving research and planning, creation and evaluation. At each stage in-house and purchased branding are substitutable, though may be considered complements in the overall process (Lowrie, 2016).

Relevant SOC 2010 codes are given in table 1, along with a few suggested roles and job titles, and their contribution to the marketing process. The occupations are broad, covering a range of roles which may or may not be suitable. To further assess their suitability for our method, we examined the original job-titles given by employers in a sub-sample of the data – the first time such data has been used in this way to the author's knowledge. From this, it was possible to categorise each individual as being relevant or not to the production of brand, and thus estimate the proportion of relevant workers for each SOC 2010 code. These are given as ranges in table 1, to reflect variations by year and in approach to categorisation.

The final challenge to address is what fraction of workers' time is spent creating own-account branding. Following the own-account software method, the appropriate time factor is likely to vary by occupation given the differing roles in the production process. These occupations are considered in turn. A range of possible factors are shown in table 1, noting the uncertainty around these, and the

https://doi.org/10.1177/002795011924900111 Published online by Cambridge University Press

Table 1. Occupations used in own-account branding estimates

SOC code	1132	1134	2473	3421	3543	3545
Description	Marketing and sales directors	Advertising and PR directors	Advertising accounts managers and creative directors	Graphic designers	Marketing associate professionals	Sales accounts and business development managers
Associated job titles	Marketing director; sales director	Account director; head of public relations	Advertising manager; creative director	Commercial artist; graphic designer	Market research analyst; marketing executive	Sales manager; business development managers
Responsibilities	Plannng, organising and directing market research and organising marketing and sales policies	Planning, organising and directing advertising and PR activity	Planning and designing the advertising activities of an organisation	Using multimedia techniques for information, entertainment or advertising purposes	Developing projects to elicit preferences of consumers	Undertaking market research to meet marketing and sales policies
Role in marketing process	Overseeing whole process	Overseeing whole process	Planning stage	Creative stage	Planning and evaluation stages	Planning and evaluation stages
Advertising or market research	Both	Mostly advertising	Mostly advertising	Entirely advertising	Mostly market research	Mostly market research
Relevant (range)	15–30%	30–45%	45–60%	15–30%	40–50%	15–25%
Own-account branding time factor (range)	10–30%	10–30%	20–40%	20%	70%	50–60%
Other own-account investments	Organisational capital (20%)	Organisational capital (20%)		Design (50%)		Software and databases (10%)

mid-points are taken for the estimates in figures 3 and 4 in each case.

First, we assume that time-factors cannot exceed 70 per cent, even if the worker appears to spend their time solely on own-account branding. This follows the OECD recommendation of only a 50 per cent time-factor for software professionals (which one would assume to do nothing else) in the creation of own-account software. OECD describe an 8-stage production process for the development of software, but note that costs associated with feasibility analysis (stage 1), training [on the new software] (stage 7), and maintenance (stage 8) should be excluded from estimates of investment. Workers will also often participate in non-core activities, such as general training (which should be excluded to avoid double-counting with training investment), unrelated meetings and corporate activities. Literature[4] also indicates that workers are not productive 100 per cent of the time due to time-wasting, while project management literature[5] indicates that resources are productive around 80 per cent of the time.

Literature on managerial time is limited, and is discussed further in the next section. A 1993 study in New Zealand (Mueller-Heumann and Osborn, 1993) suggests that marketing managers spend 28 per cent of their time "communicating with people inside the organisation", which appears most relevant to operational decisions around the marketing process. Other categories relate to managerial roles (potentially creating organisational capital), and communicating with people outside the organisation (which is more likely associated with sales). McKinsey (2011) find that directors spend around 20 per cent of their time on operational decisions, which in the marketing context is probably mainly accounted for by production of branding. In official estimates of own-account software, managers are allocated a 15 per cent time-factor. Based on this literature and the usual practice, we consider a range of time-factors of 10–30 per cent for senior managers sensible (codes 1132 and 1134).

Researchers and marketing associates (codes 3543 and 3545) are mostly involved with implementation of strategy set out by managers, particularly research

https://doi.org/10.1177/002795011924900111 Published online by Cambridge University Press

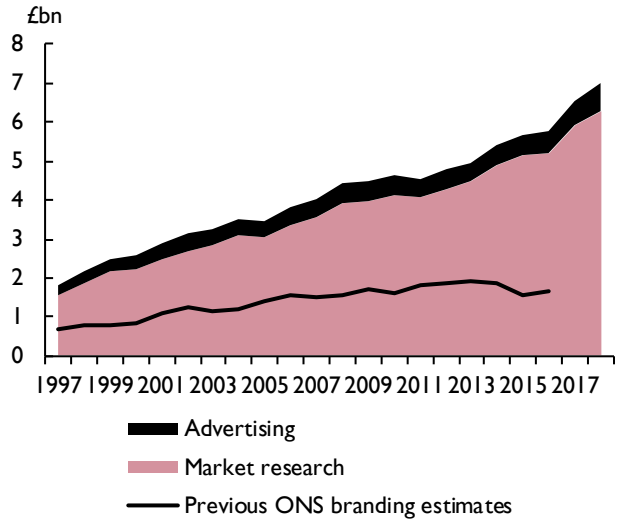
and data analysis, and appear to have limited wider responsibilities other than marketing. As such, time factors near the maximum of 70 per cent seem appropriate.

Graphic designers (code 3421) already have 50 per cent of their time allocated to own-account design investment in the intangible assets framework. In order to ensure that total time allocated to investment activities remains below the maximum 70 per cent, to prevent double-counting, we apply a relatively modest time-factor of 20 per cent. This seems appropriate given the wide range of potential activities a designer would be involved with.

Mid-level managers (code 2473) sits between senior managers and associates, so a time factor between these seems appropriate. This mirrors the distribution of time-factors used by ONS in official estimates of own-account software. We allocate the upper-end (30 per cent) of the range found for senior-managers, noting some variability around this.

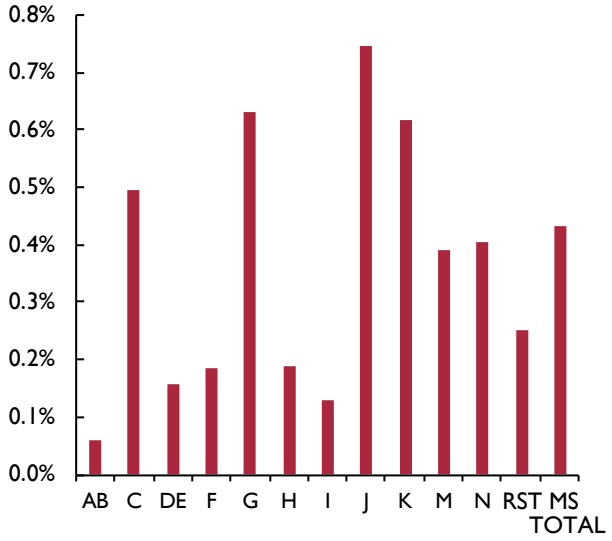
Two further adjustments are made. First, since the time-factors discussed above relate to branding activities generally (not only long-lived, investment-type activities), we again exclude the production of short-lived branding by applying capitalisation factors. We noted previously that around 60 per cent of purchased advertising and 80 per cent of purchased market research were likely long-lived. These factors are even more uncertain for in-house activities, but case studies suggest in-house staff are usually more involved in the less long-lived types of advertising, such as direct mail, promotions, and company websites. As such, we speculatively treat only 30 per cent of in-house advertising production as investment. For market research, we found no evidence that purchased and in-house market research were systematically different, so again include 80 per cent as investment.

Figure 3. New estimates of own-account advertising and market research, UK market sector, current prices



Source: ONS, author's calculations.

Figure 4. Own-account branding share of industry Gross Value Added, average 1997–2016, UK market sector



Source: ONS, author's calculations.
Notes: AB = Agriculture, forestry and mining, C = Manufacturing, DE = Electricity, gas and water supply, F = Construction, G = Wholesale and retail, H = Transportation and storage, I = Accommodation and food services, J = Information and communication, K = Financial services, M = Professional and scientific activities, N = Administrative services, RST = Arts, household and other services. MS Total = Market sector total, see figure 1 for definition of market sector.

We also exclude 95 per cent of the branding (both advertising and market research) produced by the industry that specialises in this (division 73 in the Standard Industrial Classification (SIC) 2007), since it will sell most of what it produces. This avoids double-counting with purchased branding investments. We also exclude a small amount of branding produced in selected other industries, using new ONS data on how companies generate their turnover, which suggests that several industries make a small amount of their turnover from selling branding products. Notable examples include the travel agency industry and the publishing industry.

The results of applying the parameters in table 2 to ASHE are shown in figures 3 and 4. The former shows

https://doi.org/10.1177/002795011924900111 Published online by Cambridge University Press

the total for the market sector between 1997 and 2018, for advertising and market research. Based on these estimates, the majority of in-house branding is market research, but there is also some in-house advertising. These estimates are significantly above the current ONS estimates of own-account branding, derived using standard assumptions in the literature, and call into question these assumptions. Figure 4 shows the distribution by industry, controlling for the size of the industry by taking the investment as a share of the industries' gross value added (GVA). Reassuringly, consumer facing industries, such as retail and wholesale, information and communications, and financial services appear to invest more on this basis.

Own-account organisational capital

Branding is not the only investment that businesses make in-house. Businesses also devote significant resources to improving their efficiency, instituting improvements to their processes and organisational structure. These investments often take the form of 'transformations' or 'culture change projects'. Such investments are most readily seen in the purchases by businesses of consultancy services – expert advice on how to improve operations, covering a variety of themes. In addition, many businesses re-invent themselves from within, making own-account investments in their organisational capital this way.

The aforementioned ONS surveys of businesses on intangible investments again provide evidence that these activities can be considered as investments. The average benefit life for 'business process improvement' in the 2010 survey was just over three years, and in the 2012 survey was just over four years, again validating that some expenditure in this area can be considered an investment.

Squicciarini and Le Mouel (2012) outline three methods of measuring organisational capital:

- Survey measures: gathering information from companies about their management practices, before trying to place a value on these practices.
- Effect on balance sheet: estimating the value of organisational capital by residual from balance sheets.
- Costs of production: estimating the costs[6] sunk into creating organisational capital.

Current ONS estimates use the last of these three methods. Investment is estimated using the wage bill of managers, following Corrado *et al*. (2005) in assuming an "admittedly arbitrary" 20 per cent time-factor. This was based on minimal evidence but there has been little to challenge this figure, so it is widely used by practitioners in the intangibles assets framework. We contribute to this debate by surveying the relevant literature and proposing a new approach to validating this.

It is first worth examining whether only managers create organisational capital. Squicciarini and Le Mouel (2012) use a task-based approach for the US to establish which occupations play a role in the creation of organisational capital, arguing that additional professions, such as psychologists and chiropractors, are also involved. Similarly, Gorzig, Piekkola and Riley (2011) include more occupations than just managers in estimates of intangible investment in the UK and other European countries. They find that on headcount, managers account for only around three-quarters of all organisational workers.

Theoretical models also provide an insight into which occupations create organisational capital. Ludewig and Sadowski (2009) present two models of organisational capital: one in which it exists within the workers of the organisation and one in which it rests within the structures of the organisation and would remain even if all the workers left. While they argue that the latter is a better model of organisational capital, the two models could represent types of organisational capital that coexist. In this approach, the worker model could represent a more short-term form, which depreciates as employees leave the organisation, while the structures model could represent a more long-term form, which remains when employees leave.

Black and Lynch (2005) divide organisational capital into three components: training, employee voice and work design. Training is already considered as its own asset in our framework, but employee voice and work design align with the Ludewig and Sadowski (2009) model. Work design aligns with the structural model, a form of organisational capital that should be unaffected by employee turnover, while employee voice[7] aligns with the labour model, which depends on the employees in place.

Literature on organisational culture change indicates that these models are relevant, as they largely suggest that organisational change should be decided upon by managers, with implementation done at a lower level (Khan, 2013), while feedback channels should be made available for lower level workers back to management. This implies that while there is involvement in the organisational capital creation process from non-

https://doi.org/10.1177/002795011924900111 Published online by Cambridge University Press

managerial occupations, it is more related to the short-term model which exists within workers. Therefore, the more long-term, structural form of organisational capital appears more likely to be the responsibility of managers.

Managerial time-use data would allow the question to be answered directly. While there are many studies of managerial time-use, few have the level of detail required to infer anything about own-account organisational capital investment. Table 2 provides an overview of the few relevant studies of managerial time-use, for which such an estimate can be made.

Another way to assess the validity of the 20 per cent time-factor is to assess the frequency with which organisations undergo a transformation. In the public sector, spending reviews take place on a cyclical basis, roughly every five years. This usually prompts government departments to assess their goals and objectives, set new multi-year plans, and re-structure operations: all forms of investment in organisational capital. In this sector, own-account organisational capital investment will likely be highly cyclical, with investment being lower between spending reviews.

In the private sector, there is no such coordinating cycle. It is likely that external stimuli would still play a role, however – the financial crisis in 2008 may have prompted some businesses to re-structure, and it is possible that an exit from the European Union would prompt the same. A more firm-specific stimulus may be the change of senior manager, especially the Chief Executive Officer (CEO). As such, turnover of senior managers, especially CEOs, offers a novel approach to estimate organisational capital investment.

Assume businesses are arranged on a distribution, such that some are undergoing a transformation and thus investing a lot in organisational capital, while the majority are not undergoing such a change and are thus investing much less.[8] Table 3 presents a range of possible proportions in this scenario, and their implications for the average proportion of time that

Table 2. Overview of managerial time-use studies

Authors	Year of study	Geography of study	Time-factor	Details
Robinson and Shimizu	2006	Japan	9%	Proportion of time spent on creating organisational capital by managers
Bandiera, Hansen, Prat and Sadum	2017	Brazil, France, Germany, India, UK, US	15%	Proportion of CEO time with C-suite and consultants
McKinsey	2011	Global	16%	Proportion of time spent 'setting organisation's direction, strategy' among a group of 124 'satisfied executives'
Meuller-Heumann and Osborn	1993	New Zealand	20%	Proportion of time spent 'developing plans and monitoring results' by marketing managers
Porter and Nohria	2018	US	30–70%	Proportion of time spent on 'strategy and execution' and 'the future' by 27 CEOs of companies with an average revenue of $13.1bn

Table 3. Range of scenarios for organisational capital investment

Proportion of businesses undergoing a change in year	For changing businesses, proportion of time managers spend investing	Proportion of businesses not undergoing a change in year	For unchanging businesses, proportion of time managers spend investing	Aggregate average proportion of time managers spend investing
20%	60%	80%	10%	20%
20%	40%	80%	0%	8%
15%	60%	85%	10%	17.5%
15%	40%	85%	0%	6%
10%	60%	90%	10%	15%
10%	40%	90%	0%	4%

https://doi.org/10.1177/002795011924900111 Published online by Cambridge University Press

managers spend investing in organisational capital. While all the factors in table 3 are uncertain, it is possible to estimate some.

A good proxy for the frequency of organisational culture change is the frequency of managerial change, as new managers are likely to bring with them a new way of organising a company. Marcec (2018) found that the average tenure of a CEO was 7.2 years, with the median being 5 years. This would translate to a replacement rate of between 14 and 20 per cent. However, this study was conducted in America and only applies to S&P 500 companies, so may not be applicable to the UK population.

A range of relevant measures are shown in figure 5. Data from Strategy&, a strategy consulting business owned by Pricewaterhouse Coopers (PwC), looks at CEO turnover – this suggests an average turnover rate of CEOs of about 15 per cent in the past two decades in Western Europe, which dips in 2010 in the wake of the economic downturn, and recovers since then.

It is also possible to examine managerial[9] turnover using ASHE data. To explore this, we look at the proportion of managers that have stayed in the same job as last year, as compared to being in a different job, or no job, last year. From this, we find an average annual turnover rate of 16 per cent since 1997. This figure may be an inaccurate representation of managerial turnover, as it does not account for the creation or removal of managerial positions in business.

Another approach using the same data is to calculate a length of service with an employer by comparing the employment start date with the date of the survey. Doing so reveals that between 1997 and 2018 the mean tenure of managers is nine to ten years, while the median varies from six to eight years. This increased a little post-crisis, although this may partially reflect the changing composition of 'managers' in the data as a result of a classification change. These tenure estimates also allow for a rate of manager turnover by taking the number of managers who had been with current employer for a year or less. There was a significant fall in turnover rates between 2008 and 2010, slowly rising since. Over the period, turnover of managers based on this measure ranged from 7 to 13 per cent. These are lower bound estimates, as managers could be with the same employer, but not within the same role (internal promotions). Managerial turnover tended to be higher in the private sector than in the public sector, and lower in production industries than in services industries.

Figure 5. Comparison of managerial turnover rates

Source: Strategy& and authors' calculations from ASHE.
Notes: CEO turnover rate is percentage of CEOs in Western Europe who changed due to planned exits, forced exits, and mergers and acquisitions. Western Europe economies include Austria, Belgium, Denmark, Finland, France, Germany, Guernsey, Ireland, Italy, Jersey, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom. Managers not in same job as last year and Managers not in same company last year calculated from Annual Survey of Hours and Earnings, all industries.

These estimates suggest the 10–20 per cent figure in the first column of table 3 are appropriate, assuming investments after CEO change last for only one year – if they last for longer, then the appropriate figure could be higher. The time factors are best guesses, drawing on the previously discussed literature. This approach suggests an appropriate aggregate time factor of close to, but less than, 20 per cent. Other estimates in the literature discussed previously also suggested a figure a little below 20 per cent. However, accounting for non-labour costs (which has the effect of increasing the aggregate multiplier[10] on wages), means the 20 per cent figure is probably sensible, if conservative.

Training

The idea of training as an investment has a long history, dating back at least to Becker (1964). It is closely related to the human capital literature, which has an even longer history, and is garnering increasing interest in UK policy circles today.

As noted by Haskel and Westlake (2018), there is resistance to treating training as investment due to the issue of ownership – the investment is made (for the most

https://doi.org/10.1177/002795011924900111 Published online by Cambridge University Press

part) by businesses, the asset is owned by the trainee, and the benefits are accrued by both trainee (through higher wages) and the firm (through higher productivity of the worker). In the case of general training, the trainee may still benefit if moving jobs, indicating that they own the knowledge asset, and that it is therefore not an investment by the business. But firm-specific training can be more readily seen as 'owned' by the firm, as the knowledge asset is less transferable – it is this type of training that the investment estimates attempt to capture.

The ONS survey of businesses on intangible investment records an average benefit life of training of close to three years, comfortably above the 1-year threshold for an investment. Some training undoubtedly has much longer benefits for the trainee, but since the average worker stays with the employer for only around five years, investments by businesses in training are unlikely to have a useful life longer than this on average.

Data on training in the UK has a long and mixed history.[11] Table 4 summarises some of the many surveys on the matter in recent decades, which provide the basis of the investment estimates. Current ONS estimates of investment in training by companies adopt the framework used in the Employer Skills Survey (ESS) and others. This captures direct costs to employers of providing training (such as fees to external providers, costs of running an internal training centre) and also the labour costs (opportunity cost) of trainees and trainers. This approach is well-accepted in the literature, and dates back at least to the Continuous Vocational Training Survey in 1993. It has been applied across European countries, using a similar approach to the present one, by O'Mahony (2012).

Current ONS estimates use estimates from the UK ESS every other year since 2011, as well as earlier estimates covering England only (scaled up for the UK) for 2007 and 2009. Due to lack of readily available sources, growth in training investment is assumed to be proportional to growth in compensation of employees (CoE) by industry prior to 2007. However, if the "rate of training investment" changes over time, CoE will not fully capture the trend in training investment. This creates a discontinuity in methods and estimates at 2007, which we address by using available information from earlier surveys.

We have constructed new estimates for training investment in the UK from 1985 to 2017, making use to varying degrees of the sources in table 4, and other important variables – in particular, we still use data on compensation of employees, as well as the turnover of the adult training industry (industry 85.59 in SIC 2007).

Some stylised facts on training in the UK are present in much of the literature, which the new estimates are guided by. These are:

- Training participation rates rise from the 1990s to early/mid-2000s, and fall since then. This is broadly true in most industries, although the timing of the early/mid-2000s peak varies by industry.

Table 4. Overview of survey sources on training

Survey name	Years for which data available	Geographic coverage	Information available	Industry breakdown
Labour Force Survey (LFS)	1992 to 2018, quarterly	UK	Participation in training, duration of training	Yes
Learning and Training at Work Survey (LTW)	1999 to 2001	England	Provision of training, participation in training, duration of training, cost of training (2000 only)	Limited
Continuous Vocational Training Survey (CVTS)	1993	UK	Cost of training	No
Skills Needs in Britain (SNIB)	1997 to 1998	Great Britain	Provision of training, participation in training, duration of training	Limited
National Employer Skills Survey (NESS)	2001, 2003, 2004, 2005, 2007, 2009	England	Provision of training, participation in training, duration of training, cost of training (all costs from 2005 onwards, direct costs only in 2003 and 2004	Yes (2005 onwards, limited earlier)
UK Employer Skills Survey (UK ESS)	2011, 2013, 2015, 2017	UK	Provision of training, participation in training, duration of training, cost of training	Yes

https://doi.org/10.1177/002795011924900111 Published online by Cambridge University Press

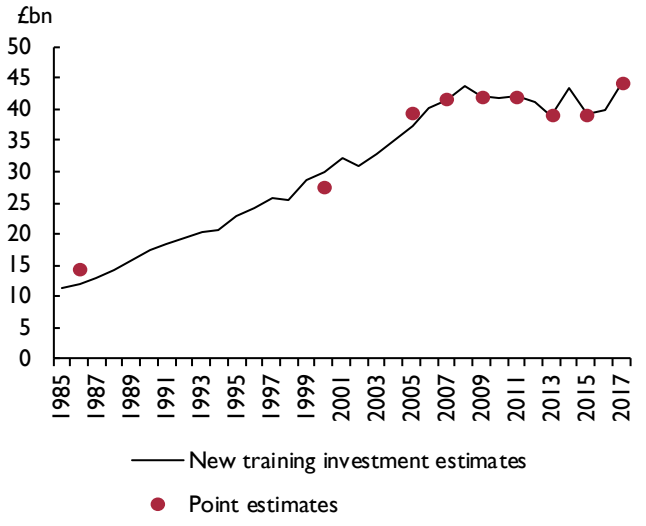
- Training duration has fallen steadily since the 1990s in most industries and in aggregate.

- Combining these facts on participation and duration, the overall volume of training delivered appears to have fallen markedly, especially since the mid-2000s. In spite of this, the level of training in the UK is thought to be relatively high in comparison to other OECD countries.

Estimates of training investment in the UK for the whole economy, in current prices (prices of the period to which they relate) are shown in figure 6. The solid line shows the new estimates, and the dots are point estimates from various surveys. The estimates coincide with the point estimates from the recent Employer Skills Surveys by design. The 2005 point is the 2005 ESS, from which industry estimates could not be obtained – the total for the whole economy is reassuringly close. The point in 2000 is from the Learning and Training at Work Survey (results scaled up for the UK) and the 1986 point is from an unpublished paper on intangible investment by John Barber. The series is remarkably close to these historic point estimates.

A few features of the new estimates are noteworthy. First, the general shape is not dissimilar from the shape of the previously published ONS estimates,[12] which were based on a simpler approach. While the new approach accounts for changes in participation, these only started to fall from the early/mid-2000s, shortly after which we use the reliable UK ESS data, so this feature impacts little. Second, there are small downturn-effects in 2002 and 2008 but these are not very large. However, the stagnation since 2008 is clear, and this coincides particularly with the fall in participation rates described previously. Based on these estimates, this does not seem to be driven purely by the methodological break. Finally, the peak in 2014 is caused by a large one-off movement in reported duration of training in the LFS data across most industries – this may be a quirk in the data, and we intend to explore this further. The estimates are reasonably volatile for most industries, and more validation is needed on these.

Figure 6. New training investment estimates, UK, current prices



Source: Various (see text), author's calculations.

Remaining gaps in the evidence base and next steps

This paper demonstrates the progress that has been made on measuring intangible assets, and how much more still needs to be done. We have used novel data sources to improve estimates of investment in own-account branding and training, and added support for existing methods of estimating own-account organisational capital investment. These improvements require further work and testing before incorporation into the next ONS publication on intangible assets, scheduled for early 2020.

There remain considerable gaps in the evidence base, which makes estimating intangible investment difficult. Those barriers most obvious to the author are outlined here:

- Time-use in the workplace – own-account investment estimates invariably rely on knowing which occupations are involved in the creation of assets, and how long they spend doing this on average. Time-use data covering the working hours, broken down by occupation and industry, would be invaluable for this approach. While traditional time-use surveys are often burdensome, new technologies could make the collection of such data easier – for instance, a snapshot of Microsoft Outlook calendars with text-mining software could be used to auto-complete many of the required fields, with the respondent needing only to add or correct selected fields. Many businesses also keep time-sheets for their staff, and having access to these would be enormously useful.

- Inclusion of intangible assets in business accounts – business accounting appears still to be coming to grips with the growing importance of intangible assets, in particular the role of data. The classic examples are

https://doi.org/10.1177/002795011924900111 Published online by Cambridge University Press

tech-giants such as Facebook and Google, whose market capitalisation dwarves the assets on their balance sheet due to the omission of their key asset – data. Just as national accounting guidelines are being debated, and the inclusion of more intangible assets considered, so too should business accounting be adapting to the digital economy.

- Consolidation of data on training – as noted by Green, Felstead *et al*. (2013), there are a large number of survey sources dating back decades which give some insight into training participation and investments. These are rarely consistent, making use of them difficult. A major piece of work to bring together all the data on training from these many sources is needed to provide the definitive view of training in the UK.

- Price indices for intangibles – all the estimates in this paper have been presented in current prices, as there is a dearth of suitable price indices covering intangible assets extending over a sufficiently long time period. Due to their nature, prices of intangible assets are difficult to measure. New assets are often customised or bespoke (especially when created in-house) and as such valuation can be difficult. Services Producer Price Indices (SPPIs) published by ONS offer a possible solution, but many only begin in 2010 when the methodology was adopted. Work to extend these, or explore alternative approaches to price measurement for intangibles, is sorely needed.

- Depreciation rates for intangibles – this paper provides some tentative indicators of assets lives for branding, organisational capital and training, drawing mostly on the ONS surveys of businesses in 2010 and 2012. Novel approaches, such as looking at staff turnover, are also helpful indicators. In the main, however, evidence on appropriate depreciation rates for intangible assets is scarce, but these are crucial to assess whether net investment (gross investments minus depreciation) is positive, and thus the stock of intangible assets is increasing. Case studies and detailed data from businesses may be helpful in this regard.

ONS has an ambitious workplan on intangible assets, reflecting the importance of intangible assets in generating value in the modern economy. This paper covers some of the ongoing developments by ONS on intangibles, and we hope to make progress in price indices and depreciation rates in the coming year as well. New experimental estimates of intangible investment are scheduled for publication in early 2020.

In doing so, ONS hopes to advance the international agenda and provide evidence and methods that can be used by other National Statistical Institutes (NSIs) in better measuring intangible assets. The challenge of the digital economy for measurement is not unique to the UK. The OECD is soon to launch a set of working groups to examine the case for changes to the National Accounting guidance, set out in the System of National Accounts (SNA). A future SNA may include additional intangible assets, drawing on the evidence developed by the ONS and the many other authors cited in this paper.

NOTES

1 This secret recipe is itself an intangible asset – the result of research and development, now a trade secret. But for this example, imagine you know it.
2 This is well established in the literature. For studies using this approach see, for example, Buck and Chaudhuri (1995), and Mehta and Purvis (2006).
3 For instance, see Binet and Field (2013).
4 See, for example, Mulholland (2004), and salary.com (2013).
5 See, for example, MindTools.
6 Some authors (see, for instance, Lev and Radhakrishnan, 2005; Eisfeldt and Papanikolaou, 2013; Li, Nirei and Yamana, 2018) use 'sales, general and administrative' (SG&A) expenditures as a measure of organisational capital investment, but this captures also spending on marketing, training and many other things, so is too broad to be useful in our case.
7 Employee voice could also refer to mechanisms to enable employees to have a voice in the organisation, which could outlast the employees themselves in the business – there is thus potentially a cross-over between these forms.
8 For instance, Bandiera *et al*. (2011) suggest that 7 in 10 Italian CEOs spend some time on strategy, so even for non-transforming businesses, the time share for this activity is unlikely to be zero.
9 Managers here are a large group, including CEOs, directors and other senior managers. It's likely that the replacement of only some of these people within a business would prompt organisational capital investment, but restricting the occupation group any further leads to highly erratic results.
10 Using a performance-based approach, Riley and Robinson (2011) find an aggregate multiplier on wages of 0.33, compared to a 0.35 multiplier if accounting for time and non-labour costs separately in an expenditure-based measure.
11 For an excellent overview see Green, Felstead *et al*. (2013).
12 These were only previously published for the market sector, but the shape of the series is similar in like-for-like comparisons.

REFERENCES

Advertising Association (2018), *WARC Expenditure Report*, accessed: 15/07/2019.
Awano, G., Franklin, M., Haskel, J. and Kastrinaki, Z. (2010), 'Measuring investment in intangible assets in the UK: results from a new survey', *Economic and Labour Market Review*, 4(7), pp. 66–71.
Bandiera, O., Guiso, L., Prat, A. and Sadun, R. (2011), 'What do CEOs do?', Harvard Business School Working Paper 11-081.
Bandiera, O., Hansen, S., Prat, A. and Sadun, R. (2017), 'CEO

https://doi.org/10.1177/002795011924900111 Published online by Cambridge University Press

behaviour and firm performance', (No. w23248), National Bureau of Economic Research.
Bean, C.R. (2016), *Independent Review of UK Economic Statistics*, HM Treasury.
Becker, G. (1964), *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*, University of Chicago press.
Binet, L. and Field, P. (2013), *The Long and the Short of it: Balancing Short and Long-term Marketing Strategies*, Institute of Practitioners in Advertising.
Black, S.E. and Lynch, L.M. (2005), 'Measuring organizational capital in the new economy', in *Measuring Capital in the New Economy* (pp. 205–236), University of Chicago Press.
Buck, R. and Chaudhuri, A. (1995), 'Media differences in rational and emotional responses to advertising', *Journal of Broadcasting and Electronic Media*, 39(1), pp. 109–25.
Corrado, C., Hulten, C. and Sichel, D. (2005), 'Measuring capital and technology: an expanded framework, in *Measuring Capital in the New Economy* (pp. 11–46). University of Chicago Press.
Denning, S. (2011), 'How do you change an organizational culture', *Forbes Magazine*, 223.
Eisfeldt, A.L. and Papanikolaou, D. (2013), 'Organization capital and the cross-section of expected returns', *The Journal of Finance*, 68(4), pp. 1365–406.
Field, S. and Franklin, M. (2012), *Results from the Second Survey of Investment in Intangible Assets*, Office for National Statistics.
Gorzig, B., Piekkola, H. and Riley, R. (2011), 'Production of intangible investment and growth: methodology in INNODRIVE', Innodrive Working Paper Series No. 1.
Green, F., Felstead, A., Gallie, D., Inanc, H. and Jewson, N. (2013), 'What has been happening to the training of workers in Britain', LLAKES research paper, 42.
Haskel, J., Goodridge, P. and Wallis, G. (2014), 'Estimating UK investment in intangible assets and intellectual property rights', Imperial College London Business School Discussion paper 2014/3.
Haskel, J. and Westlake, S. (2018), *Capitalism Without Capital: The Rise of the Intangible Economy*, Princeton University Press.
Khan, M. (2013), 'How to design and implement a strategic plan', *The Guardian online*, accessed: 15/07/2019.
Lev, B. and Radhakrishnan, S. (2005), 'The valuation of organization capital', in *Measuring Capital in the New Economy* (pp. 73–110), University of Chicago Press.
Li, W.C.Y., Nirei, M. and Yamana, K. (2018), 'Creative destruction in organizational capital: evidence from the online platform econnomy in Japan and the United States', *The 2018 IARIW Proceedings Papers*, August, Copenhagen, Denmark.
Lowrie, A. (2016), 'In-house vs. outsourced marketing: the 3 Cs of critical decision making', *Forbes online*, accessed: 15/07/2019.
Ludewig, O. and Sadowski, D. (2009), 'Measuring organizational capital', *Schmalenbach Business Review*, 61(4), pp. 393–412.
Marcec, D. (2018), 'CEO tenure rates', in Harvard Law School forum on corporate governance and financial regulation, accessed: 15/07/2019.
McKinsey & Company (2011), 'Making time management the organisation's priority', accessed: 15/07/2019.
Mehta, A. and Purvis, S.C. (2006), 'Reconsidering recall and emotion in advertising', *Journal of Advertising Research*, 46(1), pp. 49–56.
MindTools.com (2016), 'Estimating time accurately: calculating realistic project timelines', MindTools.com, accessed: 15/07/2019.
Mueller-Heumann, G. and Osborn, B. (1993), *CEOs and Marketing and the New Zealand Marketing Manager*, New Zealand Marketing Management Research Program, University of Otago, Dunedin.
Mulholland, K. (2004), 'Workplace resistance in an Irish call centre: slammin', scammin', smokin', an' leavin'', *Work, Employment and Society*, 18(4), pp. 709–24.
Office for National Statistics (2019), 'Developing experimental estimates of investment in intangible assets in the UK: 2016', accessed: 15/07/2019.
O'Mahony, M. (2012), 'Human capital formation and continuous training: evidence for EU countries', *Review of Income and Wealth*, 58(3), pp. 531–49.
Porter, M.E. and Nohria, N. (2018), 'How CEOs manage time', *Harvard Business Review*, 96(4), pp. 42–51.
Riley, R. and Robinson, C. (2011), 'UK economic performance: how far do intangibles count?', Innodrive Working Paper Series No. 14.
Robinson, P. and Shimizu, N. (2006), 'Japanese corporate restructuring: CEO priorities as a window on environmental and organizational change', *Academy of Management Perspectives*, 20(3), pp. 44–75.
Salary.com (2013), 'Why and how your employees are wasting time at work', Salary.com, accessed: 15/07/2019.
Squicciarini, M. and Le Mouel, M. (2012), 'Defining and measuring investment in organisational capital: using US microdata to develop a task-based approach', OECD STI Working Paper 2012/5.
Strategy&, of Pricewaterhouse Coopers (2018), 'CEO success', accessed: 15/07/2019.