

From the Airfield to the High Street: The Met Office's Role in the Emergence of Commercial Weather Services

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ABSTRACT

This paper explores the role of the United Kingdom's National Meteorological Service, the Met Office (MO), in the early development (1945–65) of applied, and subsequently commercial, weather and climatological services in the United Kingdom. Through examination of archival records it shows how theoretical and technological developments led to the postwar expansion of services for the general public and new user groups, resulting in funding pressure on the organization and the proactive seeking of nongovernment funding sources. The paper then explores the influence of these early developments on the subsequent large-scale expansion of applied and commercial services at the MO, which were to be enshrined in the organization's mandate when it became an executive agency under Prime Minister Margaret Thatcher's efficiency review in 1990.

It is shown that the history of the Met Office's role in applied weather services is important for understanding the organization's position today as a civil agency that acts commercially, the broader process of "agentification" of the scientific civil service, and the United Kingdom's prominence internationally in the private weather services market. By considering developments in the context of other National Meteorological Services and the international forum provided by the World Meteorological Organization, the development of weather services at the Met Office is shown to have been influenced by international best practice while remaining distinct in its approach to delivering a broad range of both public and commercial services.

1. Introduction

In the financial year 2013–14 the United Kingdom's National Meteorological Service (NMS), the Met Office (MO),¹ made an operating profit of GBP £11.2 million and paid GBP £9.5 million in dividends to its parent government department, the Department for Business, Innovation and Skills (Met Office 2014, 20–22). These figures are the latest in a long series of successful profits posted by

the organization and were announced against a backdrop of continued criticism of public agencies charging for public sector information that has been funded by the taxpayer.² In contrast, in the United States information produced by publicly funded government agencies is freely available. This American open-access approach is increasingly beginning to challenge the traditional European model of cost recovery, which treats information as a commodity to gain revenues (Weiss 2002). With other European NMSs, such as the Norwegian Meteorologisk Institutt, now providing access to all of their data for free, and campaigns such as the *Guardian's* Free Our Data gaining traction, the U.K. government has begun to issue more data under Open Government Licenses.³ Despite government departments and agencies, including the Environment Agency, Ordnance Survey, and the MO, under

¹ Although throughout its history the organization has colloquially been referred to as the Met Office, until 1996 its official name was the Meteorological Office. The abbreviation MO is used throughout.

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² For more on the debate surrounding charges for meteorological data in Europe see PRIMET 2011.

³ The Open Government License was introduced in 2010 and is based upon and designed to operate alongside Creative Commons licenses.

its data point initiative, all releasing an increased amount of data, much of the most commercially lucrative information still remains unattainable. For government agencies that operate as arm's length trading funds of government departments, such as the MO, this is perhaps unsurprising; in 2013–14 commercial contracts that may be undermined by a complete disclosure of all MO data were worth over GBP £32 million to the organization (over 15% of total revenue; [Met Office 2014](#), p. 23).

The widely differing approaches to accessing data and the pursuit of commercial contracts by the world's NMSs emerged during the second half of the twentieth century, and the histories of their development elucidate the different national political, economic, and societal contexts that each NMS operates within. This paper explores one such history detailing the emergence of commercial services and a corporate identity at the MO, showing how early developments in the period 1945–65 are important for our understanding of the MO's commercial shift in the 1980s and 90s, and more broadly of the emergence of the United Kingdom as a leading global supplier of weather services.

Since 1990, when the MO became an executive agency, then under the Ministry of Defense, the organization has had a commercial structure led by a chief executive and has been required to act in a commercial manner ([Walker 2012](#), 420–421). Part of the then Prime Minister Margaret Thatcher's drive to reduce costs and reform the civil service, the adoption of the arm's length agency model was a direct result of a report published by Thatcher's Efficiency Unit in 1988 ([Hadden 2012](#); [Jenkins et al. 1988](#)). The MO was included in the first 30 agencies created, only 12 of which exist today in their 1990 incarnations ([Table 1](#)).

The infrastructure and commercial portfolio of the MO was greatly affected by the transition into an executive agency, and the organization's present position should be considered as part of the wider "agentification" of government services in the period ([Elston 2012](#)). Yet at the same time as managing this transition, the MO also managed to obtain new government funding for non-applied research, most notably through the Hadley Centre for Climate Prediction and Research opened by Thatcher in May 1990 ([Folland et al. 2004](#)). This paper shows how the MO's broad remit, including research, civil service, and commercial elements, plus the organization's large public profile—the major constituents of its present department-agency task division ([Elston 2012](#))—all predate the formal conversion into an executive agency.⁴

By 1990 the MO was already active in 16 commercial markets, measured performance against revenue targets, and employed corporate language in official documentation ([Walker 2012](#), 419–422). Internationally, the 1980s has been identified as the decade during which many NMSs underwent substantial structural change and saw the emergence of new commercial weather services ([Freebairn and Zillman 2002](#); [Katz and Murphy 1997](#); [Maunder 1986](#)). At the MO, this period of change came under the tenure of Directors General Professor John Mason (1965–83) and his successor Professor John Houghton (1983–91). While developments under these two influential directors were in keeping with international NMS trends ([Edwards 2006](#); [Zillman 2005](#)) and both applied and commercial weather services grew under their leadership, by Mason's appointment in 1965 the MO already had two substantial weather service departments and a nascent climatological services branch ([Meteorological Office 1965](#), p. x). To understand the large-scale changes carried out during Mason and Houghton's tenures, developments must be traced back to antecedent decisions, practices, and cultures initiated in the postwar decades.

By charting this history back to the immediate postwar years, this paper shows how the initial emergence of commercial weather services within a government agency, rather than the private sector, was influenced both by funding pressures and by the MO's approach to developing its public weather services. An early interest in applied services, coupled with a creative culture within the organization, with staff often working across several branches, meant that when the commercial weather services market grew in the 1970s the MO had the capacity to dominate the sector in the United Kingdom. Further, this early development of expertise resulted in a large number of well-trained meteorologists who were familiar with creating, operating, and distributing commercial services—a factor that would go on to be important for British companies' success in the private weather market.

Beginning with the immediate postwar years, which saw the ad hoc creation of a number of tailored forecast services for government departments, businesses, and the public, this paper shows that during this period the lack of distinction made between the provision of general public and applied forecasts for businesses was important in fostering a creative but solution-focused culture at the organization that became central to its later commercial services expansion. Driven by meteorological technologies, and the ideological notion that the MO should serve all of the British taxpayers who funded its existence, rather than just specialist interest groups, in the postwar years the organization's role as a

⁴For a comparative study on the creation of other executive agencies in the United Kingdom see [Gains \(2003\)](#), and for a general overview of semiautonomous public sector agencies in the United Kingdom, see [Verhoest et al. \(2011\)](#), chapter 6.

TABLE 1. The first 30 executive agencies created in the United Kingdom and their status today (Hansard 1990; www.gov.uk).

Executive agency	Created	Staff upon creation	Status today
Building Research Establishment	2 Apr 1990	650	Private organization
Central Office of Information	5 Apr 1990	750	Closed 2011
Central Veterinary Laboratory	2 Apr 1990	550	Exists, renamed Animal and Plant Health Agency
Civil Service College	6 Jun 1989	200	Renamed National School of Government, closed 2012
Companies House	3 Oct 1988	1150	Exists
Department of the Registers of Scotland	6 Apr 1990	950	Exists, dropped Department from its title
Driver and Vehicle Licensing Agency	2 Apr 1990	5250	Exists
Driving Standards Agency	2 Apr 1990	2000	Merged with Vehicle and Operator Services Agency Renamed Driver and Vehicle Standards Agency in 2014
Employment Service	2 Apr 1990	35 000	Merged with Benefit Agency to form Job Centre Plus in 2002 Since 2011 no longer executive agency
Her Majesty's Stationery Office	14 Dec 1988	3250	Merged with the National Archives in 2006
Historic Royal Palaces	1 Oct 1989	350	Became a charity in 1998
Hydrographic Office	6 Apr 1990	1900	Exists
Information Technology Services Agency	2 Apr 1990	3000	Outsourced in the early 2000s
Insolvency Service	21 Mar 1990	1400	Exists
Intervention Board for Agricultural Produce	2 Apr 1990	850	Merged with the Department for Environment, Food & Rural Affairs (DEFRA) Paying Agency in 2001 and renamed the Rural Payments Agency
Laboratory of the Government Chemist	30 Oct 1989	300	Privatized in 1996
Meteorological Office	2 Apr 1990	2450	Exists
National Weights and Measures Laboratory	18 Apr 1989	50	Exists, renamed the National Measurement Office
Natural Resources Institute	2 Apr 1990	450	Privatized, became part of Greenwich University in 1996
Occupational Health Service	2 Apr 1990	100	Privatized, sold in 1996/97
Patent Office	1 Mar 1990	1150	Exists, renamed the Intellectual Property Office
QE11 Conference Centre	6 Jul 1989	50	Exists
Radiocommunications Agency	2 Apr 1990	450	Subsumed into Ofcom in 2003
Resettlement Agency	4 May 1989	550	Ceased to operate in 1996
Royal Mint	2 Apr 1990	950	In 2010 became Ltd Company owned by Her Majesty's Treasury
Training and Employment Agency [Northern Ireland Civil Service (NICS)]	2 Apr 1990	1600	Subsumed into Department for Higher Education and Further Learning after Good Friday agreement in 1999
Vehicle Certification Agency	2 Apr 1990	50	Exists
Vehicle Inspectorate	1 Aug 1988	1600	Merged with the Traffic Examiner organization and the Traffic Area Office Enforcement in 1991
Veterinary Medicines Directorate	2 Apr 1990	50	Exists
Warren Spring Laboratory	20 Apr 1989	300	Merged in 1994 with Atomic Energy Authority (AEA) Tech to form National Environmental Technology Centre

civil agency significantly expanded. The growth of public weather services saw a rise not only in general forecasts and warnings aimed at a mass cross section of society but also in tailored and bespoke weather and climatological services created for new user groups, such as construction companies. As these services continued to expand, no distinction was made between provisions for the government, industry, or general users; if a service could be justifiably rationalized as contributing to postwar reconstruction in the United Kingdom, then the MO would provide it, often at a highly subsidized rate.

Given new impetus in early 1953 by deficiencies in services tragically highlighted by coastal flooding that killed over 300 citizens and the arrival of a new Director, Professor Oliver Graham Sutton, the growth of both public and specialized applied services at the MO

became more formalized. Beginning with the adoption of a cost-benefit analysis approach in 1954 and influenced by international best practice, throughout the 1950s and the early 1960s the MO began to adopt more corporate language and techniques, which allowed it to show the efficiency of services and justify the organization's continued expansion.

To understand the role the MO has played, and continues to play, in the delivery of applied weather services, one cannot consider the organization's provision of these products, whether for commercial companies or other government departments, in isolation from their mandate to collect meteorological data, issue warnings, and produce public weather services. Indeed, the history of commercial weather services at the MO and the emergence of a more corporate identity for the organization

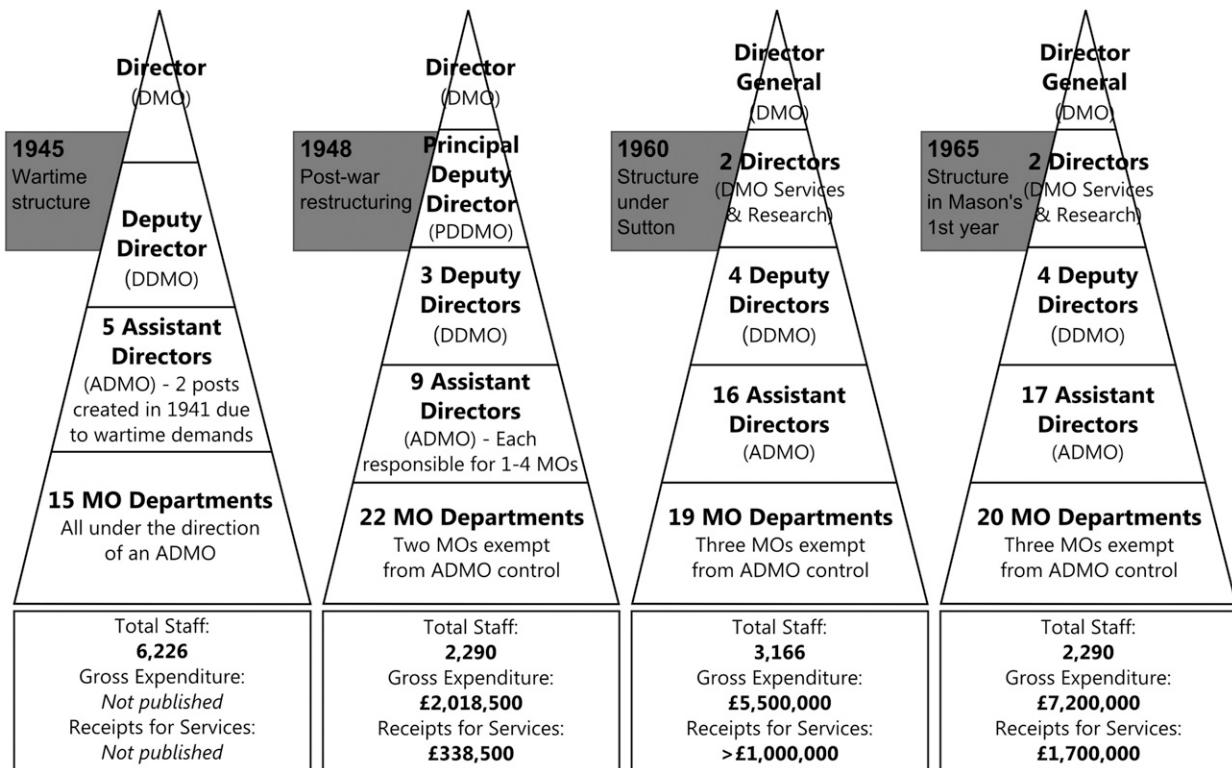


FIG. 1. Overview of the structure, size, and budget of the MO in 1945, 1948, 1960, and 1965 (Hall 2012; Air Ministry 1954; Meteorological Office 1948, 1960, 1965).

in the 1980s carry a significant imprint from the MO's postwar expansion and the creation of public weather services. By analyzing MO operations in the period from 1945 to the end of Sutton's tenure in 1965, and by connecting these early developments to later significant changes at the MO, it is shown that the organization's involvement in commercial activities long predates executive agencies and operating profits and has had a defining influence on the structure of the private weather market, not only in the United Kingdom but also internationally.

2. The postwar Met Office

Founded in 1854 as an office within the Board of Trade, in 1919 the British Meteorological Office had been moved under the control of the recently established Air Ministry. During the Second World War scientists made great developments in meteorological technologies and forecasting techniques. By the end of the conflict in 1945, the MO was playing a significant role in military and government departmental operations, and providing services to specialist interest groups such as mariners and aviators. In the years immediately following the war, senior figures at the

organization sought to capitalize on wartime developments, ensuring that in the transition to a peacetime setting, the office would continue to expand and extend its remit (Fig. 1).

The organization had long advised other government departments, the military, and a small number of British businesses for whom weather conditions were imperative to their operations. One-off inquiries were usually provided free of charge, such as a farming business looking to expand into new regions asking for climatological statistics on the area, while repeat services were usually charged for, albeit at a subsidized rate. In the immediate postwar years, little distinction was made between inquiries made by government departments, businesses, or individuals. In keeping with all other U.K. government departments in the period, decisions on whether to take on new projects were made largely within the framework of postwar reconstruction: would providing the inquirer with a service increase the nation's productivity or help keep the country moving?

In addition to the austere postwar context, the MO's parent department, the Air Ministry, was keen to show that theoretical and technological developments made under the duress of war for military purposes had

productive applications that were beneficial to a peacetime society.

In its postwar restructuring, the MO also had to incorporate the recommendations of a government white paper aimed at restructuring the Scientific Civil Service to ensure that the government could attract the highest-caliber scientists, and ensure that research and scientific expertise would be a central component of Britain's postwar reconstruction (Barlow 1945). For the MO it meant an enforced restructuring to align with other government agencies outside of the Air Ministry. The Director of the MO, Nelson Johnson, and the organization's guiding body, the Meteorological Committee, used the opportunity to allocate new operational areas their own dedicated departments (Hall 2012, p. 104).

As the MO set about this task, and developments made during the war were integrated into postwar operations, the utility of meteorological forecasting for both specialist and general users increased significantly. Through these developments came the possibility that applied weather services may be of benefit to more than the traditional big user groups: the military, aviators, and mariners. Senior figures realized that more weather services for the general public and new user groups could be of benefit to many aspects of everyday life, and the MO seized this opportunity to develop the organization's profile and prominence in British society. By 1955, the number of MO forecasts and warnings specifically tailored for government departments, public authorities, industrial concerns, and the general public had increased from just 6 in the years after the war to 19 (Meteorological Office 1947, 1948, 1949, 1950a, 1951, 1952, 1953, 1954, 1955a).

The scope of these new services was extremely broad, from local forecasts for authorities organizing the 1948 London Olympics to snow warnings created for the National Farmers Union. By the mid-1950s a wealth of new user groups were now benefitting from MO applied services. Although growing in number, these new specialist services were still considered separate from the provision of MO services for the organization's main users, the military and civil aviation, with no distinction being made between commercial and government contracts (Meteorological Office 1947, 1948, 1949, 1950a, 1951, 1952, 1953, 1954, 1955a). While the largest growth in the period was in nongovernmental services, the increase in these specialist forecasts and warnings lacked formal structure and was uneven in its distribution across sectors of British industry. With no central policy driving the desire to increase MO applied services, the creation of new forecasts, warnings, and services for nongovernment bodies was an organic process in which

the MO created a service in response to an organization's inquiry for support.

Except for these new services created in response to an inquiry from a large organization, the MO dealt with all other business inquiries in the period in largely the same manner as those from members of the public. That is, that where possible, inquiries were directed to the closest local office, which most commonly in the postwar years was a Royal Air Force Outstation, where the primary role of MO staff on site was collecting observations and giving preflight briefs to aviators. In 1950, 9000 inquiries of this nature were received by telephone at local RAF forecasting outstations; by 1955 this figure had ballooned to over 70 000 inquiries (Meteorological Office 1955b).

3. Creating a public profile

In 1953 MO Director Nelson Johnson left because of ill health caused by the stress of 15 years at the helm of an organization that had grown from a staff of 747 in 1939 to over 3000 (A.H.R.G. 1954, 489–490; Air Ministry 1954, p. 560; Meteorological Office 1953). The Air Ministry then appointed Professor Oliver Graham Sutton as the MO's new Director (Times 1953). Sutton had previously worked for the MO, and by the time of his appointment already sat on three committees that oversaw the direction of the organization. Along with several of his academic colleagues, he had already put forth ideas about the future of the MO and arrived with a clear and forthright agenda for the organization's reform (Brunt et al. 1952).

Sutton believed that to continue the MO's growth, and the associated required funding increases at a time of continued government austerity, the organization had to become relevant to every taxpaying individual and organization in the United Kingdom. The new Director's agenda was not a complete departure from his predecessor's, but he sought to give the previously ad hoc development of new services a stronger ideological rationale and a more consistent planned structure. A key focus of the proposed reforms was on services for the general user and the development of new sectors, such as agriculture and recreational groups, both areas significantly underdeveloped in relation to the services offered by other leading NMSs. For example, in 1956 when the MO introduced a telephone service that the public could dial to hear a recorded forecast, a similar service had already been on offer for several years in the United States, Sweden, France, and West Germany (Meteorological Office 1937–1954).

Before beginning at the MO, Sutton visited the U.S. Weather Bureau (USWB) to experience how the

world's largest NMS was run. What he saw directly influenced his plans to reform the MO (Sutton 1953). However, although he openly copied many ideas from the USWB, the MO's ongoing lack of distinction between the provision of services for the public and businesses remained at odds with trends in the United States. Unlike the MO's near monopoly on weather services in the United Kingdom, by the early 1950s a more market-led approach had already begun to emerge in the United States (Henson 2010, chapter 3; Spiegler 1996). The development of a nascent private market for weather services in the United States had been boosted in 1953 by the publication of an influential USWB report, "Weather is the Nation's Business." This report set clear boundaries for areas and services where the USWB would get involved, stating that

the issuance of severe storm warnings endangering life or widespread damage to property are, and should remain, the function of government but special services to industries to effect economies in their operation must be the province of the private practitioner (Advisory Committee on Weather Services 1953, p. 2).

While Sutton took inspiration from many of the more developed products and services at the USWB, his reforms should be considered part of wider international developments in the period, which saw the role and services of NMSs develop along broadly similar lines. With the World Meteorological Organization now providing an international forum that acted as a conduit for ideas between NMSs of its member countries, the period saw more common approaches to NMS operation further defined and transposed to countries still developing their meteorological services (Daniel 1973, p. 181). This professionalized model increasingly placed emphasis on two emergent roles of NMSs: first, a nation's NMS should, if not already doing so, extend its operations beyond traditional areas, such as aviation and marine services, to ensure all sectors of society could benefit from its services; and second, the NMS should consider the economic benefit of services, highlighting how its services aided the nation financially.

The West German NMS, the Deutscher Wetterdienst (DWD), was a prominent proponent and champion of both of these ideas. In April 1956, in an address circulated to MO senior staff, the President of the DWD Dr. Georg Bell spoke at length on how the German weather service directly linked to the nation's economy. His address gave empirical cost-benefit analysis examples for each of the DWD's operational areas: aviation, shipping, agriculture, health, industry, and power. It gave a clear economic incentive for government investment in the DWD, and strongly advocated meteorological applications that could benefit all sectors of society (Bell 1956a).

This increased emphasis on the economic benefits that meteorological services could provide the whole of civil society was in part influenced by growing geopolitical tensions of the Cold War, with Western governments increasingly keen to show that technological developments made for military purposes had peacetime applications that could benefit all. A British Pathé newsreel with the rather conspicuous title "Science Makes Peaceful Strides," released in 1959, depicts MO forecasters using new high-tech equipment to improve forecasts for the civilian. This newsreel highlights how the MO, still a department within the British military, and meteorology as a discipline more generally, could be co-opted to this cause (British Pathé 1959).

The visibility of meteorology as a scientific discipline within British society was given a huge boost in January 1954 with the launch of a new format for televised weather on the British Broadcasting Corporation (BBC). For the first time British households saw a MO meteorologist beamed live into their homes every day. The first MO member of staff selected for this role, George Cowling (Fig. 2), soon became a household name and is remembered for his conversational style that aimed to relate directly to the general user (Telegraph 2009; Higham 2014). Cowling's descriptive approach and informal language was in fact part of a planned strategy, as those developing the new format sought to "humanise the weather" (Rawes and McGivern 1953). The result was the adoption of a more deterministic forecast style, rather than the probabilistic language forecasters in the period were more familiar with (Hall 2012, 182–187).

The development of the new TV format grew out of concerns over the availability of weather information to the general public. Because of the reallocation of Britain's radio bandwidth within Europe, the MO's most successful public communication avenue, the radio station Airmet, had been off the air since 1950. Broadcast on longwavelength radio, Airmet provided listeners with airfield weather reports, an outlook of the current weather, commentary by the duty forecaster, and other weather station reports, including warnings (Currie 2010, p. 253; Watson-Watt 1951, 552–555). Airmet's withdrawal contributed to a lack of efficient channels at the MO for the dissemination of forecasts, which was tragically highlighted in early 1953 when coastal flooding devastated the east coast of England causing 307 fatalities and inundating over 160 000 acres of land (Hall 2011; Waverley 1954). Despite the MO predicting a higher than usual tide and gale force winds, a lack of understanding of the physical properties of storm surges and the absence of a coastal warning system meant that the afflicted communities were silently hit by a wall of water while they slept. A government review into events



FIG. 2. George Cowling presents the new format forecast in early 1954, accompanied by a weather chart with a hand drawn weather system (used by permission of the Press Association).

highlighted the slow progression of the storm system, and stated that a warning system with better dissemination of forecasts could have prevented many of the deaths. The review led to the creation of a warning system along the east coast, the precursor to today's MO-run National Severe Weather Warning service (Hall 2011, 2012, p. 158).

Directly influenced by these events, the new, more personable television format was an immediate success, receiving plaudits from meteorologists, traditional MO customers, the media, and the general public (Rawes 1954; Morgan 1954). The next year the MO established a dedicated Public Services Department and a myriad of new services followed, including regional radio forecasts, an automated telephone service, and weather bulletins on the new commercial, Independent Television Network (Hall 2012, p. 204). The creation of new forecasts on TV and radio, and a central role in a plethora of new public services, including the new coastal warning system, all meant that by the mid-1950s, on top of their traditional specialist services, the MO had expanded to become a publicly recognized civil agency.

4. A more corporate identity

As the MO continued to develop new public services, the organization increasingly needed to justify the continued growth of their budget at a time of government austerity. Influenced by the economic rationale being highlighted by other NMSs, most notably the cost-benefit

approach of the DWD, senior figures increasingly began to highlight the efficiency and utility of each service they produced (Walker 2012, p. 337). Thus, when Sutton outlined a vision for the future of the MO in July 1954, which included the creation of new departments, the establishment of public facing regional offices, and the centralization of all major departments in a new purpose built headquarters, the Air Ministry convened a departmental committee to review the proposals and explore their cost implications (Sutton 1954). The committee reined in nearly all of Sutton's ideas, recommending cheaper versions were possible. For the creation of regional weather centers, the most costly of the proposals, they did not provide outright support. However, as they had no ideological objection to the notion of a regionalized public and specialist user group services structure, the committee stated that if sufficient funding and a detailed cost-effective model of operation could be established, local units should be developed to provide forecasts that went into detail beyond the national scale (Brabazon 1956).

The committee's report was clear: while treasury funding for the organization would likely continue to incrementally increase over the coming years, the MO would have to develop other models for funding non-essential services. The MO had always charged businesses or individuals who approached them for support, but the fee for such services had often been nominal and subsidized. Whereas previously these services had been

established after an external inquiry, the organization now began to proactively seek such contracts. The widely distributed MO information pamphlet *Your Weather Service*, first printed in 1950, dedicated a section to the different weather services the organization provided and contained an appendix with approximate costs for such services. Stating that

[w]hen a weather factor enters into some manufacturing process, or into some special undertaking, connected, possibly, with business or sport, the trifling cost of a special forecast, or series of forecasts is often a sound investment (*Meteorological Office 1950b*, p. 26).

By 1959, *Your Weather Service* was into its third edition and a series of free educational leaflets produced by the MO began with two titles solely concerning the services that customers could purchase (*Meteorological Office 1958, 1962*).

Following the pattern of applied weather service expansion in the immediate postwar years, the MO now also began to expand the tailored climatological services they were offering both the public and businesses. Beginning with the separation of climatological research and climatological services into two distinct departments in 1954, by the early 1960s the MO Climatological Services division was providing services in relation to building design, motorway construction, forward planning of water supplies, storm water drainage systems, river flooding, and dam construction (*Meteorological Office 1963*). The rapid expansion of climatology at the MO was aided and accompanied by strong links with the WMO, which were strengthened further in 1957 when R. G. Veryard, the head of Climatological Services at the MO, became President of the WMO Commission for Climatology (*Davies 1957*).

As more applied services were developed, a disconnect began to emerge between the personal face being promoted through the newly established Public Services Department and an organizational identity that while at its core was still a civil agency, increasingly sought private contracts and was more corporate with the language it employed. Nothing encapsulates this tension in the development of services at the MO more than the creation of the regional weather centers.

Without explicit support for the regional centers, amid concerns that they would be costly and a step backward for a discipline seen as increasingly moving toward automation and the use of mass telecommunications and broadcasting, it took Director Sutton three years to justify their importance and budget for their creation. In doing so, senior figures at the MO expounded the centers as places where both the public and regional businesses could get advice that went beyond

routine forecasts. Sutton viewed the development of the centers not as in conflict with the increasing automation of services, but rather as an extension of this trend: one day, each regional center would create its own specialized forecasts for TV, radio, telephone, and local businesses (*Sutton 1955, 1956*).

Opened in August 1959, the London Weather Centre (LWC) contained a forecast broadcasting space, a room for interviews with inquirers from the business community, a general inquiries information desk, and a large shop front window displaying forecast maps and weather information (*Hunt 2007*). It was an immediate success. Its predecessor, the less publicly accessible London Forecasting Office, received approximately 90 000 inquiries in 1958, while within four years of the LWC opening the number of inquiries the center received annually exceeded 200 000. Now that the MO had shown that the format for a public and business-oriented regional office worked, other centers were opened in Glasgow in December 1959, Manchester in June 1960, and Southampton in December 1961. Retrospectively, Sutton stated that the creation of these centers had been driven by the inability of local forecasting offices to cope with the surge in public demand for services. By 1963, the MO was receiving 800 000 public inquiries a year, and with many aviation forecasting offices unable to cope, further regional weather centers were opened, eventually peaking at 13 in the 1980s (*Meteorological Committee Paper 1963; Hunt 2007*, p. 143).

If we consider the position of the MO in the early 1960s in light of its growing network of regional high-street weather centers, and compare it to the other large British government organizations that were also to become executive agencies in the late 1980s and early 1990s, we see its position is unique. The scale of public interaction and the number of inquiries dealt with by the regional centers alone was perhaps only surpassed in the period by the Employment Service, whose role and central mandate required face-to-face contact (*Table 1*).⁵ In comparison to other scientific government agencies in the period, the MO's public profile and contracts for applied services were unparalleled. Today, the U.K. Hydrographic Office, despite still lacking the public profile of the MO, structurally operates along broadly similar lines to the MO, delivering commercial services globally and posting an operating profit twice

⁵ In the period 1945–65 unemployment in the United Kingdom averaged 400 000 (*Pollard 1983*, 328); even accounting for those who were permanently unemployable it seems feasible that annually the Employment Service were dealing with more than the 800 000 public inquiries the MO reported in 1963.

that of the MO in 2013–14 ([United Kingdom Hydrographic Office 2014](#), p. 5). Yet despite the similarities today and the fact that both organizations had a similar profile in the prewar years, in the early 1960s the Hydrographical Office was still an almost exclusively military facing organization. By 1961, in light of developments at the MO, this military focus was under scrutiny and questions were being asked of the Hydrographic Office's lack of commercial operations and services ([Hansard 1961](#); [Ministry of Defence 1962](#)).

Meanwhile at the MO, with the rapid growth of inquiries and the regional weather centers' direct contact with consumers came a wealth of data on which sectors of society were utilizing forecasts both by region and time of year. In the early 1960s the MO Public Services Department began analyzing this growing amount of user data, identifying ever-smaller user groups, such as horticulturalists and gardeners, further tailoring services, and separating commercial avenues from more generalized free public services ([Meteorological Committee Paper 1962a](#)). The adoption of an approach that relied on numerical data to inform the growth of services reflected methods that had been used by the German DWD since the mid-1950s. In 1956 the DWD had advised the MO that if they were to significantly improve their business weather services, consultation must be decentralized to regional centers to help facilitate a more personalized and tailored service ([Bell 1956b](#)). The regional structure of both the DWD and the USWB, although initially determined by the larger landmass covered by these NMSs, seems to have greatly influenced senior MO staff in their pursuit and setup of regional weather centers in the United Kingdom.

Reflecting the emergence of a more consumerist society in the United Kingdom in the second half of the 1950s ([Hennessy 2007](#); [Hilton 2007](#); [Zweiniger-Bargielowska 2000](#)), the MO increasingly began to refer to “customers” rather than “users” and to separate commercial services from those that should be provided as part of the government's sovereign responsibility to protect its civilians. While it effectively operated a monopoly on weather services during the period by increasing its public-oriented services and commercializing them where possible, to the general user the MO became simply another organization providing another product.

By mid-1962, as data from the huge number of inquiries now being handled were accumulating, the MO was finally able to produce figures on the estimated economic benefits of their services. The first report produced from these data showed that an extremely diverse range of customers, from public utilities to banana importers, were now reliant on MO services to save their organizations substantial costs. MO daily forecasts, tailored

for specific client needs, were saving businesses anywhere from GBP £100 to £1000 per week. Furthermore, MO extreme weather warnings had helped farmers save entire crop yields worth thousands of pounds, and MO services for public utilities saved the Gas Council alone several million pounds per year ([Meteorological Committee Paper 1962b](#)). Maunder identifies the analysis of such gains or losses as one of the first steps toward valuing the weather and thus producing successful commoditized weather products ([Maunder 1986](#), 47–49).

The report on the economic benefits of MO services did not go as far as to draw any conclusions based on the relative importance and value that services may have held for different user groups or customers. So while the MO were beginning to understand the economic value of their services, they had not yet begun placing a distinction on costs saved by commercial companies, public utilities, or from their mandatory civil responsibilities, such as storm warnings. This lack of distinction is evident in the financial reporting used in MO annual reports from the period, with only a single figure for the recovery of all services—“government, non-government, sales of equipment etc.”—being reported. However, even if we take the rudimentary figure of total income received, we see that as a percentage of the gross annual expenditure of the organization the income received from such services rose from 17% in 1948 to 24% by 1965 ([Fig. 1](#)). Despite the gross expenditure of the organization more than trebling in the same period, this large proportional increase in the income the MO was generating from the delivery of services highlights the changing distribution of MO priorities that would go on to be central to its restructuring in subsequent decades.

The United Kingdom's emerging expertise and authority in the production of weather services was further bolstered in 1963 when the University of Birmingham launched its Master of Science (MSc) in Applied Meteorology and Climatology, the first course of its kind in the United Kingdom. Central to the course's early success was the utilization of MO trained staff ([Giles 2014](#)).

When Sutton stepped down in 1965, the organization was now unified in a new purpose-built headquarters; had an organizational structure that clearly separated scientific research, operations, and services; had a regional structure of public and local business-facing weather centers; and was confident in using empirical customer data to justify the expansion of services.

5. Developments after 1965

Sutton was succeeded in October 1965 by Basil John Mason, a former Professor of Cloud Physics at Imperial College, London, and at 42 a relatively young appointee

for such a senior position. The new Director General immediately set the tone for the rest of his tenure by moving the computer-led Numerical Weather Prediction trials then underway from research mode to operational forecasts (Mason 2010, 2–3). To announce the launch of the new numerical forecasts on 2 November 1965, Mason held the MO's first ever press conference (Walker 2012, 360–361), which gave the MO “unprecedented coverage both in the press and on TV” (Golding et al. 2004, p. 300). The launch of MO press conferences was another important milestone in the evolution of the organization, the development of its corporate identity, and its relationship with the British public.

Mason was in charge of the office for 18 years and in this time he presided over a large number of significant changes, including the extension of the Bracknell headquarters and the establishment of the United Kingdom's role in the WMO's World Weather Watch and Global Atmospheric Research Programme (Walker 2012, 378–387).⁶ His tenure has been characterized as one predominantly focused on technological improvement, especially of computing power and automatic systems, the overhaul of recruitment and training, and the ongoing justification and expansion of services (Golding et al. 2004; Mason 2010; Walker 2012). In this last area, Mason built upon the work began under his predecessor, using empirical and cost–benefit analysis arguments to pressure for increased funding. In a 1966 Royal Meteorological Society address, Mason expanded on earlier Meteorological Committee papers, giving a detailed economic rationale for MO services. In this paper Mason discusses market research and how the MO are endeavoring to engage with agriculture, industry, and business at a “board-room level” (Mason 1966). While this is indicative of a progression toward a more commercial focus for the MO, it must be acknowledged that the address dedicates just as much coverage to services that benefit the nation as a whole, and that this speech was delivered some 10 years after similarly influential publications and addresses in the United States and Germany, respectively (Bell 1956a; Advisory Committee on Weather Services 1953).

Mason retired from the helm of the MO in September 1983, and was replaced by the Director General who is today most commonly associated with the growth of commercial services at the MO, Professor John Houghton. Early in his time at the head of the organization, again in response to increasing funding pressures, Houghton

established a commercial marketing department at the MO. This new wing provided dedicated resources and a coherent structure to the active seeking of commercial contracts (Houghton 2011, 159–161; Houghton 2013, 112–113), which had with a more limited focus been sought since the establishment of the regional weather centers in the early 1960s. As external pressures on funds, largely driven by Margaret Thatcher's Efficiency Unit review, continued to mount, and as Houghton struggled to wrest control of the organization's finances from the Ministry of Defense, amid some calls for privatization, new specialized and commercial services were increasingly sought (Houghton 2011, p. 157; Walker 2012). Eventually these pressures led to the establishment of the organization as an executive agency in 1990, as detailed in the introduction of this piece. Houghton had a good relationship with Thatcher and, along with other influential figures including civil servant Crispin Tickell and businessman James Goldsmith, was instrumental in encouraging Thatcher to become one of the first world leaders to speak out about climate change in the late 1980s (Guise 2014).

Although active since at least the late 1940s, it was while Houghton was at the helm of the MO that the private market for commercial weather services in the United Kingdom began to expand substantially (Bartlett and Bartlett 1949; Lynagh 1995). The success of many early private companies providing commercial weather services relied upon expertise accumulated at the MO over the preceding decades, with many individuals who had developed their skills across various departments at the MO joining private ventures. For example, the Managing Director of Noble Denton Weather Services in the mid-1980s Arthur Blackham had been recruited from the MO in 1976 (Blackham 1990). One of the early success stories in the U.K. private weather market, in 1985 Noble Denton became the first private weather forecasting service to provide forecasts for a national network when they began providing the forecasts for the “Oracle Teletext” weather pages (Weather 1986). Perhaps the most high-profile example that illustrates the importance of MO-developed expertise to the early success of British private weather service providers was Noble Denton's appointment of the MO's first TV forecaster George Cowling (Fig. 2). In the early 1980s Cowling joined the business working on a project mapping environmental extremes in the North Sea, where his “genius” chart-drawing skills, honed over many years of drawing synoptic charts live on air, were invaluable to the success of the project (Blackham 1990, p. 314). This pattern of MO trained specialists being vital to the early success of private weather service providers in the United Kingdom

⁶ For more on the WMO and international developments in the period, see Daniel (1973).

was repeated across the sector, and was a crucial element in assisting British companies' success globally.

While this paper has focused largely on the period 1945–65, it is clear that in the future as documentary and archival evidence from the Mason and Houghton years continues to be made public, there is a need for further historical analysis that adds detail to the biographical and contemporary accounts briefly sketched above.

6. Conclusions

In the period from 1945 to the mid-1960s, the MO developed from an organization known by only a limited number of specialist users to one with a recognizable public identity. Increasingly corporate in its identity and activities, the MO operated with a relative degree of autonomy from central government, and now referred to users, clients, and products, and attempted to justify its services through studies of costs and benefits. While many areas of the MO remained largely unchanged in tradition and structure, the public profile and commercial services of the organization promoted by senior staff, the Public Services Department, and the new regional weather centers quickly became unrecognizable from the organization's postwar position. The network of military men and scientific civil servants that emerged out of the Second World War had now been replaced by university-educated meteorologists who were conversant in the language of business and public relations. The ability to act, speak, and be perceived as one coherent corporate body was of great benefit to the MO in increasing its prominence and in asserting its position as a source of scientific expertise in British society. This authoritative and trusted position went on to be crucial in the early expansion of commercial services at the MO, and subsequently, as we have seen, the development of a private sector for weather services in the United Kingdom.

A cursory reading of the postwar role of the MO in the development of weather services in the United Kingdom suggests that their early expansion into applied services, which in the United States were largely the realm of the private market, furthered their monopoly on U.K. weather services and was a stifling factor in the emergence of a private market. However, a closer reading of events has shown that how the MO developed these services was just as important. The lack of clear demarcation between general, public weather services and specific, applied services afforded a creative approach within departments at the MO. The development of commercial services interacted and was influenced by other initiatives such as TV forecasting and high-street consultancy spaces, benefitting from subsidized costs as these new provisions were considered part of broader

programs. Furthermore, the need to justify the costs of these initiatives prompted the organization to explore other models of funding. Most importantly, the decision by the 1955 review committee to not give outright support for Sutton's regional weather centers forced the organization to begin proactively seeking commercial contracts and other sources of income.

While we have seen that many of the major commercial developments at the organization occurred after 1965, this paper presents a narrative of continuity across the postwar development of the MO. In turn, each head of the organization was faced with funding pressures driven by both internal factors, such as the increased cost of technological innovations, and external factors, such as government austerity and efficiency measures. It is clear that future historical study of the Mason and Houghton years is required; however, by introducing antecedent developments at the MO, this paper shows that the emergence of commercial meteorology in the 1980s and 1990s cannot be understood without appreciation of the primary role that NMSs played in the earlier development of applied services for industry and business.

The creative approach to developing applied meteorological services at the MO in the postwar period trained a large number of meteorologists in the development of applied scientific services and familiarized them with the economic realities of developing new services. The early accumulation of this expertise is important in understanding not only the MO's continued prominence in these areas today, but also the position of the United Kingdom, and British companies, as world leaders and internationally renowned providers of commercial and applied weather services.

An understanding of the early development of applied and tailored weather services at the MO illuminates both the organization's position today as a profit-making civil entity and the prominent position of the U.K. private weather market internationally. While external economic and political pressure may have still led the organization to become an executive agency in 1990, without the growth of novel applied services and non-government funding sources in the decades that followed the war, it is likely that the scope, public prominence, scale, and department-agency task division (Elston 2012) of the MO today would have looked significantly different. As the MO today aims to be a market leader in the expansion of new climate services through its Climate Service U.K. national framework⁷

⁷ See <http://www.metoffice.gov.uk/services/climate-services> for more on climate services at the MO and the Climate Services U.K. national framework.

the long-established expertise of the organization and its tradition of creatively combining academic research, civil services, and commercial operations appears set to continue into the foreseeable future.

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