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Gautam Mukunda, "We Cannot Go On: Disruptive Innovation and the First World War Royal Navy." *Security Studies* 19:1 (January 2010): 124-159

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Large military institutions are often portrayed as being inherently conservative and having a tendency to cope poorly with innovation. However, since some such challenges have been handled highly effectively, this knee-jerk assumption is clearly inaccurate. Moreover, it leaves open an interesting question: how can we explain the discrepancy between successful and unsuccessful adaptation to change? Why is it that an army or navy that responds extremely effectively to one challenge can fail to cope with another? It is this question that Gautam Mukunda seeks to address using a body of theory borrowed from business studies. The result is an article that is an interesting and rewarding read, which adds to an understanding of both naval warfare in the First World War and also the process of coping with innovation. There are many aspects to commend and also a few areas where the theory might usefully be further developed.

The question that the author poses is why the Royal Navy (RN) proved so successful in the First World War at countering the submarine threat against the battlefleet and yet proved so slow to meet the threat posed by U-boats against merchant shipping. Despite the fact that submarines represented a highly novel threat to warships, the RN was able to develop a remarkably effective system of anti-submarine defence. Several warships were sunk, including three obsolescent armoured cruisers by a single U-boat on 22 September 1914 and the pre-dreadnought battleship HMS *Formidable* on New Year’s Day 1915. Yet as the author states, not a single British dreadnought — the most advanced and powerful class of battleship — was sunk by a U-boat.¹ This was achieved not merely by adding new weapons and new classes of escort but also by throwing overboard such cherished operational approaches as the close blockade of the enemy coast (144-147). In Mukunda’s words, “The British so effectively defeated the threat to the fleet that it is easy to miss the scale of their achievement. They neutralized a major aspect of a revolutionary new weapon before it fired a shot” (159). This judgement is an important corrective to the tired cliché of blind conservatism and inability to innovate; however, it only throws into sharper contrast the failure to meet the other problem posed by U-boats, the threat to merchant ships. U-boat attacks on shipping came close to forcing Britain out of the war and were it not for the slow development of the campaign (due to Germany’s lingering reluctance to cast off international law, for fear of driving the United States to declare war), they might well have done so. The author sets out the evidence convincingly; suffice it to note that the worst month for losses of merchant shipping in either World War was April 1917 when over 880,000 tons of shipping were sunk. Moreover, as he points out, there was a “readily available” (125) solution in the form of convoy and escort, which contained the threat if not quite defeating it.

So, there is a genuine puzzle to be resolved. How can a novel threat be met so competently in one area and so poorly in another? The author explains this by use of theory borrowed from business studies, namely the idea of “disruptive innovation” (DI) proposed by Clayton Christensen (explained 126-130). Put simply, this theory contends that a successful business would not be in that position if it routinely neglected innovation but that not all innovations have the same effect. Those impacting the company’s primary mission, or

¹ A modern dreadnought, HMS *Audacious* was sunk by a mine in October 1914 but this was laid by a merchant ship converted to operate as a minelayer; Robert K. Massie, *Castles of Steel: Britain, Germany and the Winning of the Great War at Sea* (London: Pimlico, 2003), 139-43.

“sustaining innovations”, tend to be coped with highly effectively but those affecting secondary missions can be overlooked. This latter category constitutes “disruptive innovations”, defined in the “Generalized DI” theory developed in the article as “innovations that require successful organisations to improve at secondary tasks but not at primary ones” (127).

Mukunda argues that this theory explains both why the RN was successful in devising a system of anti-submarine warfare to protect its fleet and also why it struggled to counter the threat to merchant shipping, since commerce protection was seen in the pre-war period as very much a secondary role. His Generalized DI theory also predicts the likelihood of “overshoot,” by which a focus on the primary task detracts from performance of secondary tasks as the organization becomes more specialized (129); the problem that with disruptive innovations, the organisation will lack crucial information or even the knowledge of how to acquire it (130); and the need to address the problem by creating independent organisations to focus on it and to develop new metrics appropriate to it (135-136). Each of these predictions is borne out in the case study (143-147, 156-57).

The article has many strengths, not least the nuanced approach that characterizes it. For example, rather than claim that his theory is a complete answer Mukunda accepts that it and cultural theories of organizational behaviour are complementary rather than mutually exclusive (136-139). He also notes that the wartime case for adopting convoy was by no means clear cut: some of the arguments against it — and there were arguments, not solely a thoughtless preference for “offensive” operations, though this did exist — were wrong-headed but some were worthy of consideration. Most of them were, as he suggests, “reasonable, but wrong” (152). Such a careful approach to the evidence is important when employing a social sciences methodology, where the temptation to beat the history into a shape that can support the theory is not always resisted. It is to the credit of the author that he does resist it, and the article benefits greatly from his considered approach.

The historical understanding on which the article rests is sound, aided by the use of a good range of the standard secondary sources; it is heavily reliant on Marder but also uses newer works such as those by Gordon and Massie, as well as the insightful but often neglected Hezlet.² One surprising omission is the official history of the Royal Navy in the First World War, which would have added depth if not any strikingly different insights.³ The memoir by Admiral Reinhard Scheer⁴ (commander in chief of the High Seas Fleet and then Chief of the German Naval Staff) might have provided a useful complement to that of his British counterpart Admiral Sir John Jellicoe (Commander in Chief of the Grand Fleet and later First Sea Lord), on which the author does draw.

Some minor historical quibbles might be raised. First, the author is perhaps a little harsh in his judgement on the efficacy of Q-ships (merchant vessels with hidden weapons intended to ambush attacking U-boats),

² Arthur J. Marder *From the Dreadnought to Scapa Flow: The Royal Navy in the Fisher Era* (five volumes, London: Oxford University Press, 1961-1970); Andrew Gordon, *The Rules of the Game: Jutland and British Naval Command* (London: John Murray, 1996); Massie, *Castles of Steel*; Arthur Hezlet, *The Submarine and Sea Power* (London: Peter Davies, 1967).

³ Julian S. Corbett, *History of the Great War, Naval Operations* (volumes one to three, London: Longmans Green, 1920 onwards); Henry Newbolt, *History of the Great War, Naval Operations* (volumes four and five, London: Longmans Green, 1928 onwards).

⁴ Reinhard Scheer, *Germany's High Sea Fleet in the World War* (London: Cassell, 1920).

evaluating them according to the number of U-boats they destroyed (150).⁵ Even if a Q-ship did not sink a submarine, its presence could foil an attack, and the possibility of its presence forced the U-boat to attack underwater and thus to use up its small load of torpedoes, compelling it to cut short its patrol and once again to run the gauntlet of minefields between its bases and patrol areas. The number of U-boats sunk is not a good statistic for evaluating the effectiveness of commerce defence, because it fails to include submarine attacks frustrated or prevented. Second, the criticism of a slowness to redeploy destroyers from the Grand Fleet to escorting convoys (153) is justified but risks underplaying the importance of their role with the battlefleet, which was critical in preventing German capital ships from reaching the shipping lanes. It also overlooks their important contribution to commerce defence in countering attacks by German destroyers and torpedo boats in the Channel. These are truly minor reservations, though, which do not affect the overall argument.

One area where the argument of the article might be further developed lies in the framing of precisely how the submarine affected the missions of the RN. The author reasonably defines the “goal” of the RN as “win the naval component of World War 1”. To achieve this the primary mission was “maintain the superiority of the Grand Fleet”, over and above the secondary mission of “protecting sea lines of communications” (140-142). However, these are perhaps not best depicted as two separate missions: the need for the Grand Fleet to be superior to any enemy fleet was itself the main way that sea communications were protected. The latter was the primary objective, the former was a means to that end rather than being an end in its own right. As long as the Grand Fleet remained superior, the enemy battlefleet could not interfere with merchant shipping, which would then face nothing more dangerous than a “*guerre de course*” (literally, “war of the chase”) conducted by raiding surface cruisers. Historical experience suggested that these could be a nuisance but could never have the lethal, strangling impact of a full naval blockade such as a superior enemy battlefleet could impose. As the Admiralty (and, indeed, its German counterpart) understood naval warfare, the continued superiority of the Grand Fleet would achieve Britain’s paramount aim of ensuring the use of the sea and denying it to the enemy. It is therefore not surprising that the RN had successfully incorporated improvements to the accuracy of battleships’ main armament (noted by the author, 134-135), which truly was a sustaining innovation. The threat posed by submarines to the British battlefleet also had to be met for the fleet to be able to conduct its main role and hence to achieve the primary mission; developing a system of anti-submarine defence was another sustaining innovation.

The threat that the submarine posed to merchant shipping was, however, of a quite different nature and magnitude. As Mukunda argues, the Admiralty’s low opinion of the impact of a *guerre de course* conducted by surface raiders proved to be well founded: “Had U-boats never been used as raiders, it would have been right” (142). The innovation of using submarines to attack merchant shipping raised the possibility that the hitherto ineffective raiding strategy of *guerre de course* could for the first time have a decisive, even war-winning effect even when Britain held the command of the seas in traditional terms (148). The problem for the RN was not

⁵ The table of U-boat losses provided (150) is incomplete, lacking as it does an entry for those sunk by gunfire, while the total listed adds up to 152 as against the actual total of 178. The table given is based on John Terraine, *Business in Great Waters: The U-Boat Wars 1916-1945* (London: Leo Cooper, 1989), 142; here, however, Terraine lists some but not all of the causes of U-boat losses. He provides a fuller list in Appendix G – *ibid.*, 772 – which includes a figure of 20 for gunfire (11 of which, or 6% of total losses, were achieved by Q-ships) as well as the total of 178 U-boats lost. The arrangement of Terraine’s tables makes it difficult to deduce the individual figures but going back to the source *he* used suggests figures as follows: mines 48, depth charges 30, gunfire 20, ramming 19, accidents 19, unknown causes 19, torpedo 18, towed explosive sweep 3, aircraft bomb 1, unknown explosion 1. Robert M. Grant, *U-Boats Destroyed: The Effect of Anti-Submarine Warfare 1914-1918* (Penzance: Periscope Publishing, 2002), 159.

simply that a secondary mission faced a new challenge but rather that the overriding goal of the organisation could not be achieved without a fundamental rethinking of the priority accorded to its missions: a new and additional primary mission had to be acknowledged as being of equal importance to the historic first priority. Meeting this strategic challenge required even more imagination and creativity from the RN than countering the tactical threat to the battlefleet — which could be seen as no more than a modified version of the threat posed by small torpedo boats, which had itself been successfully countered.⁶ It would be interesting to see how the DI theory might treat the argument that the innovations of using the U-boat against surface warships and against merchant shipping were not simply two sides of the same coin but were rather quite different. There might be a case for unpacking the concept of “missions” in order to represent more clearly the relationship between ends, ways and means.

Incidentally, there was a third facet to the challenge that the submarine posed for the RN, and considering how this aspect of the innovation was handled might shed further light on the DI theory. In addition to being a threat to the British battlefleet and to merchant shipping, the submarine also offered the RN a powerful weapon for its own use that could assist the battleship in its major role of attacking enemy warships. In this role the submarine presented another challenge to how the RN conducted its missions — yet here too, the RN incorporated the innovation effectively, with its submarine arm proving remarkably effective, both against warships and against other submarines.⁷

The positive use of the submarine by the RN suggests a further question for DI theory. As argued above, increasingly accurate gunnery enhanced the ability of the traditionally dominant system to perform its principal task against its enemy counterpart. Meeting the U-boat threat to the battleship was more challenging, as an innovation that threatened the ability of the dominant system to continue performing its accustomed role. Nevertheless, given the importance of this role — in terms of naval strategy as well as the self-image of the institution — it is not surprising that this threat was successfully countered. The First World War submarine was relatively primitive and when used against enemy warships, it represented a complement to the battleship rather than a competitor; as such, it could be incorporated with some institutional adaptation but did not demand any great questioning of cherished nostrums. Yet what if the submarine should improve to the extent that it could conduct the principal role of the RN more effectively than the battleship? What if it promised to become the first-choice means of neutralising the enemy surface fleet? This is precisely what advocates of the nuclear-powered submarine were to argue during the Cold War period. An even more radical challenge can be envisaged: what if an innovation should promise not merely to outperform the battlefleet in its principal role of securing the seas in wartime, but to leave this very task unnecessary? This claim would be made on behalf of air power in the interwar period and nuclear weapons from 1945: there would be no need to protect shipping, it was argued, when wars would be settled by direct attacks on the enemy's cities, so there would no longer be a need for the RN to perform its principal mission of securing the use of the sea — or, indeed, any mission at all.⁸

⁶ See Tim Benbow, “Navies and the challenge of technological change,” *Defence Studies* 8:2 (June 2008): 208-210.

⁷ Corbett, *History of the Great War, Volume I*, 236–238; *Volume II*, 285–288; *Volume III*, 24–29, 68–83; Edwyn Gray, *British Submarines in the Great War* (London: Charles Scribner, 1971).

⁸ For this argument and its unravelling, see Benbow, “Navies and the challenge of technological change,” 210-219.

This line of thought suggests that not all innovations are equal. A hierarchy of innovations can be envisaged, ordered in terms of how radical their impact is, that might be put in the terms of DI theory. Most institutions have a key goal and a primary mission that accomplishes it; there will often be one particular system or means that has traditionally conducted this mission. First, least radical in impact and least challenging, an innovation might improve the ability of this familiar, dominant means to accomplish the primary mission, thus consolidating its position. Second, an innovation might challenge the ability of the dominant means to achieve this mission, throwing into doubt its continued centrality or even viability. Third, an innovation might change the priority of the various missions of the institution, even bringing into question the continued relevance of one or more of them. Fourth, an innovation could offer new ways of achieving the mission. Finally, at the most far-reaching end of the spectrum, an innovation could raise doubts over whether the goal itself is still necessary, raising a question over the fundamental *raison d'être* of the organisation. Each of these claims has been made about the impact on naval power of certain innovations⁹ — and, of course, much of the debate has turned on precisely which is the category that applies to the impact of a particular innovation. Essentially, this is the difference between an innovation having an effect that is evolutionary or revolutionary.¹⁰ There is an important difference between innovations that strengthen the ability of existing weapons to perform their principal role, innovations that would threaten their ability to perform it, innovations that could better perform it, innovations that would rearrange the hierarchy of missions, and those that would eliminate the need to achieve the organisation's overall goal. These are increasingly difficult for an organisation to respond to and would also appear to be increasingly “disruptive”. It would be interesting to see how Generalized DI theory might be used to address innovations that vary in magnitude in this way.

In sum this is an interesting and valuable article that I have already started to recommend to students with an interest in First World War naval warfare or the broader question of how the armed forces cope with innovation. It succeeds in establishing that DI has something to offer in terms of helping to explain innovation and the armed forces, and also suggests that further development of the theory might be productive. As Mukunda writes, “This story can be plausibly told in many ways. An account of a rigid and incompetent bureaucracy is not one of them.” (158) In shooting down this particular canard so convincingly, the author provides a useful service; he does so even more by putting in its place a more interesting question and offering a thought-provoking answer to it.

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⁹ Ibid., 207-226.

¹⁰ The issue of whether a particular innovation is evolutionary or revolutionary, and the implications of this distinction, are covered in the literature debating the existence and impact of “revolutions in military affairs”. For a survey of the debate and of the main approaches to it, see Tim Benbow, *The Magic Bullet? Understanding the “Revolution in Military Affairs”* (London: Brassey's, 2004), especially 13-23.

counter-insurgency”, *Contemporary Security Policy*, Vol.28 No.1 (April 2007); “Talkin” about my generation? Assessing the concept of “Fourth Generation Warfare””, *Comparative Strategy*, Vol.27 No.2 (April-June 2008); and “Irresistible force or immoveable object? The “Revolution in Military Affairs” and Asymmetric Warfare”, *Defense and Security Analysis*, Vol.25 No.1 (March 2009). He is currently writing a book for the US Naval Institute Press entitled *The Royal Navy and British Defence Policy, 1945-1968*.

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