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Organizational learning capability and battlefield performance: The British Army in World War II

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Max Visser
Institute for Management Research, Radboud University, Nijmegen, The Netherlands

Abstract

Purpose – While intended as a bridge between the concepts of learning organization and organizational learning, current conceptualizations of organizational learning capability still predominantly lean toward the learning organization side, specifically directed at profit firms. The purpose of this paper is to propose a four-dimensional model of organization learning capability that leans more toward the organizational learning side, specifically directed at nonprofit and government organizations in general, and army organizations in particular. This model is applied to the British Army in the Second World War.

Design/methodology/approach – The paper entails a secondary analysis of historical and military sources and data.

Findings – It is found that the British Army possessed only a moderate learning capability, which can be plausibly, but not exclusively, related to differences in battlefield performance between the British and the German Army in the Second World War.

Research limitations/implications – The research scope of the paper is limited to the analysis of one particular army in the Second World War. Implications for theory reside in the importance of organizational learning capability and its dimensions to the effectiveness of "lessons learned" processes inside organizations.

Practical implications – The paper has clear practical implications for armies and organizations that resemble armies in one or more aspects, like prisons, correctional facilities, police forces, hospitals, mental institutions and fire departments.

Originality/value – The paper ranks among the first organizational papers to analyze army operations and functioning from the perspective of organizational learning capability.

Keywords Organizational learning capability, Empowerment, Battlefield performance, British Army, Error openness, Knowledge conversion

Paper type Research paper

The importance of learning in and by organizations has since long been recognized by organization scientists. In particular, in the past three decades, the interest in

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organizational learning and learning organizations has been growing, as evidenced by increasing numbers of journal articles, reviews and books (Argote, 2011; Bapuji and Crossan, 2004; Easterby-Smith and Lyles, 2011). This does not imply, however, that there has been an equivalent growth in common conceptual understanding and theoretical convergence among learning scholars. According to many observers, this still is a field characterized by conceptual diffusion and confusion, despite some attempts at conceptual order (Huysman, 2000; Tosey *et al.*, 2012; Visser, 2007).

One of the most important and enduring differences can be found between the concepts of learning organization and organizational learning (Chiva and Alegre, 2009; Örtenblad, 2013; Tsang, 1997). Most of the literature on the first concept has adopted a prescriptive, practice-oriented approach, directed at developing learning organizations. Mostly designed for profit firms looking for organizational survival in highly volatile markets, this literature is both optimistic and normative about the necessity of double-loop, generative and other forms of deep learning for such survival (Pedler *et al.*, 1997; Senge, 1990). Most of the literature on the second concept has adopted a descriptive, scientific approach, directed at analyzing organizational learning. This literature is less optimistic and normative about the necessity and possibility of deep learning in organizations (Easterby-Smith *et al.*, 1998; Örtenblad, 2002).

To bridge the gap between these concepts, an increasing number of studies have attempted to identify factors that influence the development of *organizational learning capability* (Goh *et al.*, 2012; Prieto and Revilla, 2006; Van Grinsven and Visser, 2011). However, this literature still predominantly leans toward the learning organization side, emphasizing the necessity of deep learning and mainly diagnosing profit firms in industry and services sectors. Although some authors here diagnose the learning capability of government and nonprofit organizations, they uniformly apply the same instrument to all organizations, perhaps unsurprisingly finding that government and nonprofit organizations are less capable of learning than the profit ones (Goh and Richards, 1997; Moilanen, 2001).

But diagnosing organizational learning capability may be equally useful for organizations not facing existential dangers in highly volatile markets, and thus not experiencing a pressing need for deep forms of learning. Government and larger nonprofit organizations, for example, often face complex societal and political problems and situations, which, when not adequately solved and dealt with, make them the object of media and political scrutiny. At the same time, their continuing existence is mostly not at stake. Consequently, these organizations need to become particularly good at single-loop, adaptive and other less deep forms of learning, and a diagnosis of their learning capability would profit more from organizational learning than learning organization theory (Browne and Wildavsky, 1984; McHargue, 2003; Visser and Van der Togt, 2015).

Army organizations appear as particularly interesting cases in this respect. On the one hand, armies arguably face the most dynamic and competitive situation any organization may encounter, i.e. actual war. On the other hand, their existence, at least in an institutional sense, is generally not at stake, although naturally victory and defeat may have a large impact on army functioning. Furthermore, the common image of armies as hierarchical and bureaucratic "machines" appears at odds with the degree of adaptability that organizations should possess when dealing with such dynamic and competitive situations, according to current organization theory (Cycyota and Ferrante,

2007; Grissom, 2006; Mutch, 2006; Stokes, 2007). In other words, army organizations appear to pose a "learning paradox" here (Ahlstrom *et al.*, 2009; Mastenbroek, 1996).

Although for a long time, the military appeared to be somewhat neglected in organization science, in recent years, there has been a renewed interest in researching contemporary army organizations (Bijlsma *et al.*, 2010; Di Schiena *et al.*, 2013; Stothard *et al.*, 2013). The "learning paradox" has been studied in particular in the context of the US Army, whereby the solutions that the Army has posed to the paradox (e.g. establishing a Center for Army Lessons Learned, the consistent use of After Action Reviews) has received most attention (Baird *et al.*, 1997; Chua *et al.*, 2006; Darling *et al.*, 2005; Wheatley, 1994). Another line of fairly recent research has adopted a more historical approach, studying the "learning paradox" in the US Army in Vietnam (Daddis, 2013) and Iraq (Boo, 2010); in the British Army in Afghanistan (Farrell, 2010; Foley *et al.*, 2011); in the Israeli Defense Force after 1948 (Horowitz, 1970; Isaacson *et al.*, 1999); and in the German Army in the Second World War (Noble, 2003; Visser, 2008, 2010).

This paper purports to contribute to previous theory and research along two lines. First, a four-dimensional model of organization learning capability is proposed that leans more toward the organizational learning side, and that is specifically directed at government and nonprofit organizations in general and army organizations in particular. Second, this model is applied to an army organization that has largely escaped the attention of recent military researchers, but nevertheless exerted a strong influence on the course of twentieth-century history, i.e. the British Army in the Second World War. On the basis of a secondary analysis of historical and military sources[1], it is argued that the British Army possessed only a moderate learning capability, which can be plausibly, but not exclusively, related to differences in battlefield performance between the British and its main adversary in the Second World War, the German Army.

Towards these purposes, this paper proceeds as follows. In the second section, the four-dimensional model of organization learning capability is outlined, which in the third section, is applied to the British Army. In the fourth section, a comparative analysis of British and German battlefield performance is presented, while the paper closes with conclusions and discussion.

Dimensions of organizational learning capability

Given its emphasis on public problem-solving by government and nonprofit organizations, in this paper, organizational learning is regarded as "the detection and correction of error", whereby an error is defined as a problematic situation, involving a discrepancy between what organizations and their members aspire or expect to achieve and what they actually achieve (Argyris and Schön, 1978, p. 2, 1996; March and Olsen, 1975). An organization's capability to detect and correct errors is here supposed to have four dimensions, based on a synthesis of those dimensions, distinguished in the literature, that appear particularly relevant to government and nonprofit organizations in general and army organizations in particular (Table I):

The first dimension, *degree of empowerment*, comprises the dimensions' participative decision-making, leadership commitment and empowerment, involved leadership and operational variety from Table I. It refers to the degree to which decision-making responsibilities are (de)centralized in organizations. Sub-dimensions include the degree to

Source	Dimensions of organizational learning capability
Mallén *et al.* (2015), Guinot *et al.* (2015), Mbengue and Sané (2013), Alegre and Chiva (2008, 2013), Alegre *et al.* (2012), Camps *et al.* (2011), Fang *et al.* (2011), Chiva and Alegre (2009), Chiva *et al.* (2007)	(1) *Experimentation*; (2) *risk taking*; (3) interaction with the external environment; (4) *dialogue*; (5) *participative decision-making*
Hooi and Ngui (2014); Nwankpa and Roumani (2014), Lopez-Cabrales *et al.* (2011), Jerez-Gómez *et al.* (2005)	(1) Managerial commitment to learning; (2) systems perspective; (3) *openness and experimentation*; (4) *knowledge transfer and integration*
Stothard *et al.* (2013), Watkins and Dirani (2013), McHargue (2003), Marsick and Watkins (2003)	(1) Create continuous learning opportunities; (2) *promote inquiry and dialogue*; (3) *encourage collaboration and team learning*; (4) *create systems to capture and share learning*; (5) *empower people toward a collective vision*; (6) connect the organization to its environment; (7) provide strategic leadership for learning
Shipton *et al.* (2013)	(1) *Developmental orientation;* (2) *HRM focus*; (3) customer-facing remit
Moilanen (2001)	(1) Driving forces; (2) finding purpose; (3) *questioning*; (4) *empowering*; (5) *evaluating*
Goh and Richards (1997)	(1) Clarity of purpose and mission; (2) *leadership commitment and empowerment*; (3) *experimentation and rewards*; (4) *transfer of knowledge*; (5) *teamwork and group problem solving*
DiBella *et al.* (1996)	(1) Scanning imperative; (2) *performance gap*; (3) concern for measurement; (4) *experimental mindset*; (5) *climate of openness*; (6) *continuous education*; (7) *operational variety*; (8) *multiple advocates*; (9) *involved leadership*; (10) systems perspective

Note: Dimensions in *italics* are included in the model in this paper

Table I.
Dimensions of organizational learning capability

which lower-level managers and employees may show independent decision-making, problem-solving and initiative taking; the degree to which managers are open to new ideas and initiatives by employees; and the degree to which managers have a more enabling and motivating attitude, as opposed to a more coercive and controlling attitude. It is supposed that the more decision-making responsibilities are decentralized to lower-echelon employees, the higher the probability is that they will make errors.

The second dimension, *degree of error openness*, comprises the dimensions' openness, experimentation, risk-taking, inquiry, dialogue, questioning, evaluating and multiple advocates from Table I. It refers to the degree to which organizational learning climates are open or closed toward errors. Sub-dimensions include the degree to which errors are admitted and surfaced, as opposed to denied and covered up; the degree to which errors (when they do surface) are considered by management as opportunities for reflection and inquiry, as opposed to opportunities for punishment and threats; the degree to which managers and employees trust each other; and the degree to which

existing practices are regularly evaluated or not. It is supposed that the more open towards and tolerant of errors organizational learning climates are, the higher the probability those errors may be surfaced and corrected.

The third dimension, *degree of knowledge conversion*, comprises the dimensions' knowledge transfer and integration, and systems to capture and share learning from Table I. It refers to the degree to which lessons learned from past errors are being translated, stored and disseminated in organizations. Sub-dimensions include the degree to which organizations maintain knowledge systems, repositories, internal training programs and formal and informal networks within the organization for translating, storing and disseminating lessons learned. It is supposed that the more organizations translate, store and spread lessons learned from previous error detection and correction in and through these formal and informal means and channels, the higher the probability that these organizations as a whole may learn from these experiences.

The fourth dimension, *degree of adequate human resource management and development*, comprises the dimensions' development orientation, human resource management focus, continuous education, collaboration, teamwork and group problem-solving from Table I. It refers to the degree to which organizations adequately deal with their personnel. Sub-dimensions include the degree to which organizations pay attention to training and educating their employees; the degree to which organizations put effort in team building and developing unit cohesion; and the degree to which organizations provide challenge and support to their employees. It is supposed that the better selected, educated, trained and motivated organization members are, the more decision-making responsibilities they can handle and the more responsibilities can be delegated to them, which brings us back full circle to the first dimension.

These four dimensions are supposed to form a configuration or gestalt, to the extent that they dynamically interact in the determination of organizational learning capability (Meyer *et al.*, 1993; Miller, 1996; Siggelkow, 2002). When the dimensions are positively configured, they may constitute a productive learning cycle, and, when negatively configured, they may constitute a defensive learning cycle. Changes in one dimension always lead to corresponding changes in the other dimensions, so that improvement or deterioration in one dimension will soon or later affect the other three dimensions.

The British Army

These dimensions of organizational learning capability may be applied to the British Army organization as follows[1]. Regarding the *degree of empowerment*, the British Army in the Second World War came from a tradition as an Imperial Army, accustomed to fighting brief, small-scale colonial wars in disparate areas around the vast British Empire. At the heart of this tradition stood the British Army's regiments, which were responsible for maintaining one of their two or three battalions overseas. While the regimental system in general fostered an excellent "*esprit de corps*", strong unit cohesion and identification, and provided room for local experimentation, during the Second World War this system hampered the adoption of army-wide doctrine and tactics and the formation, development and training of coherent fighting units at the brigade and division levels. Further, continuity and cohesion at these levels suffered from regimentally induced wholesale replacements of battalions inside divisions, from the rotation of battalions between the Home Office and field commands, and from frequent leadership changes at senior levels. The latter problem, combined with the lack of

army-wide doctrine, led to radically different operational styles, meaning that divisions and higher had to learn a new way of waging war with each new commander (French, 2001; Hart, 2001; Heginbotham, 2000; Rippe, 1985).

To avoid the massive manpower attrition of the First World War (the "Shadow of Passchendaele"), already in the 1930s, the British Army had come to rely on "combined arms operations to generate overwhelming firepower" (French, 1996a, p. 170). However, only in 1942 did Field Marshall Bernard Montgomery apply it successfully in the North African desert. Building on recognized British strengths in artillery, logistics and administration, his operational methods were characterized by careful and methodical planning, achievement of a distinct material superiority and the concentrated and coordinated use of artillery fire power and tactical air power. The purpose was to curtail German operational maneuverability and flexibility, and to engage the Germans in attritional, massive set-piece battles, which Montgomery knew in the long run would exhaust the scarce German human and material resources (Buckley and Sheffield, 2014; Hart, 2001, 2007; Porch, 2000).

The decentralized nature of the British Army and the lack of army-wide doctrine led to different styles of command and empowerment across echelons. On the one hand, junior officers were required to obey orders to the letter, and rather than taking independent action and seize battlefield opportunities, they were encouraged to wait for orders ("Befehlstaktik"). Under Montgomery's command, also more senior officers were "gripped" in this way (Hart, 2007, p. 76; Scott, 1985). On the other hand, senior commanders were allowed much leeway in interpreting doctrine and applying general principles of war, stemming from a general distaste of abstract rules and ideas and an inclination towards improvisation and pragmatism among these senior commanders (Buckley and Sheffield, 2014; French, 2001; Hart, 2001; Heginbotham, 2000).

Regarding the *degree of error openness*, when in the course of 1940-1942, the British Army suffered a long line of defeats at the Germans' hands, this led to efforts toward face-saving, protection of reputation and putting the blame on others, rather than openly and honestly evaluating strengths and weaknesses. Class differences between senior officers and the rank and file hampered communication from the bottom up and advice seeking from the top down, as well as cooperation between older, socially exclusive units and newer units. These class differences were exacerbated by the hierarchical culture, criticizing commanders only possible in euphemistic and diluted terms and valuing loyalty over honesty. Furthermore, senior officers and the War Office made a habit of censoring lessons-learned material, fearing that an open discussion of errors by both commanders and troops might adversely affect troop morale and public opinion. Only when the British Army gradually gained successes in N-Africa and Italy, did the pace of learning increase, because the British made it a habit to learn from success only, not from failure (Hart, 2001, 2007).

Further, error openness was not encouraged by the inclination of the two most influential British senior commanders Brooke and Montgomery to "ruthlessly weed out any officer who they believed was not competent to do his job" (French, 1996b, p. 1,197). Not only did this lead to a quick rotation of divisional commanders, it also made them reluctant to act boldly and to gamble, because gamble could imply failure, and failure could imply the end of a successful career (French, 1996b; Hart, 2001).

Regarding *degree of knowledge conversion*, in general, the British Army lacked appropriate mechanisms to draw and disseminate combat lessons-learned. Only

halfway the Second World War did the Army establish the Directorate of Tactical Investigation to adopt a more professional and scientific approach to the analysis of lessons learned. Among senior commanders, Montgomery, in particular, recognized the importance of lessons learned from immediate post-battle analysis, and saw to it that these lessons were disseminated though education of his senior officers (and through them further down the chain of command), and to his troops through memoranda, pamphlets and other written materials. He then based his doctrine and training on these lessons learned, emphasizing retraining in the field. But his traits of arrogance, egoism and condescension also hampered this whole lessons-learned process: troops had to learn the "gospel according to Monty" (Hart, 2001, p. 125; 2007). However, as his approach was only gradually backed up and propagated by the War Office, until 1944, it remained particular to the armies under his command. Also, most other senior commanders did not consider field training and retraining under combat conditions very important, leaving it to the Home Office or the regiments (Hart, 2001, 2007; Heginbotham, 2000).

Regarding the *degree of adequate human resource management and development*, throughout the Second World War, the British Army experienced problems with the quality and quantity of officers and men. With regard to officers, class considerations were influential in determining officer suitability, and only in 1942 did the War Office establish selection boards for a more rigorous and objective assessment. Further, only after 1942 did Officer Cadet Training Units receive their training from battle-experienced instructors, which until then were reassigned to front-line units, because of manpower shortage. In spite of allegations of "Blimpism", most senior officers had received a broad staff college education in tactics, military law and organization, geography and foreign affairs, history, economy and more. However, the staff colleges tried to produce both good staff officers and commanders. According to many observers, turning out good commanders should have been a priority, and these commanders should have been separately trained from staff officers. But this was not done, partly because of the fear of training "arrogant staff officers" in the German mould, partly because higher training continued to be carried out through Army exercises (although these were held only twice between 1925-1935). Not surprisingly, by 1944, two main weaknesses were identified among the British corps and divisional commanders: "they had not been trained in peacetime for their wartime roles, and the course at the staff college was insufficiently related to staff and command duties in battle" (French, 1996b, p. 1190-1191). These deficiencies, however, were partly overcome by the attempts of Field Marshals Brooke and Montgomery to promote only competent and professional officers, at least within the armies under their command (Hart, 2001, 1996b; Rippe, 1985).

With regard to men, the quality of the most important branch, the regular infantry, was diluted by the assignment of the best men to the industry, the technical branches and other services. Within the army, many good men were diverted to various Special Forces that grew beyond all reasonable bounds to the equivalent of six divisions, where the British Army only employed 18 first-line infantry divisions. British morale, influenced by the First World War traumas, remained vulnerable, and throughout the Second World War, commanders were cautious and conscious of the continuing needs for maintenance of morale and casualty conservation. Casualty conservation was driven by acute manpower shortages in the UK by 1943, and by political and imperial

considerations, in which the British were aware that after the Second World War they needed a strong and large standing army to play a continuing role in world politics against the USA and Russia (Beevor, 2012; French, 1996a; Hart, 2001).

For example, much of Montgomery's seemingly erratic operational conduct of the Normandy and Market-Garden campaigns can only be comprehended in relation to these two overriding concerns (Buckley and Sheffield, 2014). Morale was boosted by Monty's methodical and cautious approach, in which victory was practically ensured through large advantages in material and numbers. Casualty conservation was important in halting seemingly promising exploitation of operational successes in Normandy and thereafter, and also "explains in part the unimpressive combat performance of Anglo-Canadian forces in Northwest Europe […] why numerical superior forces […] failed to achieve decisive penetrations" (Hart, 2007, p. 66).

Military justice in general was lenient, with no soldier being executed for desertion during the whole war. In practice, the Army combined psychological treatment for "exhaustion" victims and suspended sentences for deserters to make the best use of the limited manpower available. On the whole, the military justice system reflected the essentially civilian attitudes among the rank and file in the Army (Beevor, 2012; French, 1998, 2000; Hart, 2007).

To conclude, in terms of the four dimensions of organizational learning capability, first, in the British Army in the Second World War, officers and men on the whole were little empowered. Second, reporting of errors was unwelcome and covered up. Third, lessons learned from these errors were slowly and partly disseminated throughout the whole army. Finally, officers and men were moderately well selected, trained and organized for both front-line and staff duties. All in all, the British Army appears to present a relatively defensive learning cycle.

British and German battlefield performance

To assess relative battlefield performance, it is important to find engagements in the Second World War that permit a more or less fair comparison between British and German Army units without too many confounding influences of Allied air and naval superiority, Allied and Axis political developments and relative differences in combat experience[1].

For several reasons, the Italian campaign between September 1943 and June 1944 appears suited for that purpose. First, it affords a comparison of German and British Army performance at a time and place in which Allied naval and air superiority did not yet decisively impact ground operations. Although the initial landing at and securing of the Salerno beach head was aided by Allied naval and air bombing, in later engagements the rugged mountainous terrain and adverse weather conditions made Allied naval and air support much more difficult (Graham and Bidwell, 1986). Second, it affords such a comparison at a time that the German Army, although badly battered at Stalingrad (December 1942), did not yet experience the profound impact of the Normandy invasion, the massive Red Army Offensive Operation Bagration, and the attempted assassination of Hitler (June-July, 1944) (Beevor, 2012). Third, it affords an assessment of the development of battlefield performance of the British Army over nine months of intense fighting, after its initial string of defeats during 1940-1942 and its successful comeback in the North African desert (Buckley and Sheffield, 2014; Gooderson, 2008; Graham and Bidwell, 1986).

For these reasons, the Italian campaign has been intensively researched by Trevor Dupuy, a retired US Army Colonel and military historian. In addition to historical-narrative accounts of the Italian campaign (Beevor, 2012, pp. 528-545; Graham and Bidwell, 1986), Dupuy and his team developed the Quantified Judgment Model (QJM) to assess battlefield performance in a more quantitative way. This model involved the identification and quantification of 73 battlefield performance variables, pertaining to weapons, terrain, weather, season, air superiority, posture, mobility, vulnerability, tactical air effects and intangible factors such as leadership and morale (Dupuy, 1985, 1986). While not without its critics (Brown, 1986, 1987; Geldenhuys and Botha, 1994) and extensions (Rowland, 2006), the QJM in general has remained robust under criticism (Dupuy, 1986, 1987).

Dupuy tested the QJM on the basis of 60 division-size engagements in the US Fifth Army zone in Italy between September 1943-June 1944. He selected this particular zone because both ground and air operations took place in a confined operational area between the Tyrrhenian Sea and the Apennines, which permitted a better comparison of forces than would be possible in less strictly confined areas (Dupuy, 1985). Because the Fifth Army zone involved the commitment of USA, as well as British and Commonwealth divisions, out of Dupuy's original 60 engagements, I have selected those 28 that only involved British divisions. Table II contains the various campaigns, engagements, German and British units and other necessary data (based on Dupuy, 1985, pp. 234-235). In this table, it can be seen that seven British and seven German divisions were involved in these engagements, in which the British divisions enjoyed an average numerical superiority of about 40 per cent over their German counterparts.

Dupuy developed two measures to analyze engagements in the Italian campaign. The first measure, combat effectiveness value (CEV), is concerned with the ratio of relative combat outcomes and combat power. In a formula, it is defined as: $CEV = (R_g/R_a)(P_g/P_a)$, whereby $CEV_g = 1/CEV_a$ and vice versa (Dupuy, 1986).

In this formula, the first part, R, represents Result, defined by three sub-measures: mission accomplishment (the extent to which opposing sides succeed in achieving their goals); spatial effectiveness (the number of miles gained or withdrawn in an engagement); and casualty effectiveness (the number of daily inflicted casualties, controlled for the size of the opposing sides). Calculating R values for the German and Allied sides in the engagements results in R_g/R_a ratios, reflecting the actual outcome of an engagement (Dupuy, 1985, 1986).

The second part of the CEV formula, P, represents Combat Power, which in its turn is defined as: $P = S \times V$. Here S represents Force Strength, a quantification of the lethality of all infantry, artillery, armor and air support weapons used into an Operational Lethality Index, modified for the effects of environmental variables (like weather, terrain and season) on the effectiveness of each weapon. Further, V represents Variables affecting the employment of the force under the circumstances existing as the time of the engagement. This includes tangible factors like posture, terrain, weather, mobility and vulnerability and intangible factors like leadership, training, experience, morale and logistics. Calculating p values for the German and Allied sides in the engagements results in P_g/P_a ratios, reflecting the theoretical outcome of an engagement (Dupuy, 1985, 1986).

Applying this CEV formula to the 28 engagements between British and German forces (Table II), the average CEV_g of 1.55 (or corresponding CEV_b of 0.65) seems to

Table II.
Selected engagements British–German troops, Italy 1943-1944

Nr.	Engagement	Brit. div.	N_b	Germ. div.	N_g	CEV_b	SEV_b	SEV_g
Salerno Campaign, September 9-18, 1943								
D1	Port of Salerno, *September* 9-11	*46 I*	12,917	16 Pz	4,250	0.79	1.02	3.85
D2	Amphitheater, *September* 9-11	*56 I*	12,917	16 Pz	4,250	0.46	0.99	2.75
D4	Vietri I, *September* 12-14	46 I	12,917	*HG Pz*	15,000	1.04	1.78	2.30
D5	Battipaglia I, *September* 12-15	56 I	11,230	*16 Pz*	14,730	0.19	1.61	2.86
D7	Vietri II, *September* 17-18	46 I	18,912	*HG Pz*	13,300	0.78	1.59	1.74
D8	Battipaglia II, *September* 17-18	*56 I*	14,730	16 Pz	6,995	0.73	0.88	2.02
Volturno Campaign, October 12-December 8, 1943								
D10	Grazzanise, *October* 12-14	*7 A*	14,557	15 PzGr	8,068	0.46	0.68	2.05
D11	Capua, *October* 13	*56 I*	16,857	HG Pz	8,000	0.13	1.08	3.94
D15	Castel Volturno, *October* 13-15	*46 I*	17,765	15 PzGr	8,158	0.41	0.51	2.94
D17	Canal I, *October* 15-20	*46 I*	17,500	15 PzGr	8,138	0.90	0.93	1.73
D18	Monte Grande, *October* 16-17	*50 I*	16,400	HG Pz	7,239	0.71	0.76	2.20
D19	Canal II, *October* 17-18	*7 I*	14,600	15 PzGr	8,138	0.91	0.75	1.60
D20	Francolise, *October* 20-22	*7 I*	14,000	15 PzGr	8,088	0.85	0.96	1.06
D22	Monte Camino I, November 5-7	*56 I*	19,513	15 PzGr	6,750	0.52	0.81	2.06
D25	Monte Camino II, November 8-12	56 I	5,200	*15 PzGr*	7,942	0.26	0.42	2.24
D27	Calabritto, December 1-2	*46 I*	17,765	15 PzGr	7,588	0.79	0.84	2.95
D28	Monte Camino III, December 2-6	*56 I*	20,744	15 PzGr	3,288	0.79	1.25	3.27
Anzio Campaign, January 22-February 29, 1944								
D30	Aprilia I, January 25-26	*1 I*	19,350	3 PzGr	6,750	0.49	0.81	4.60
D31	The Factory, January 27	1 I	17,976	*3 PzGr*	15,317	0.59	0.73	1.10
D32	Campoleone, January 29-31	*1 I*	17,766	3 PzGr	15,098	0.77	0.88	1.71
D33	Campoleone counterattack, Feb. 3-5	1 I	9,734	*Kg Greizer*	26,029	0.85	3.14	3.11
D34	Carroceto, Feb. 7-8	1 I	4,515	*3 PzGr*	26,490	0.98	1.56	1.47
D36	Aprilia II, Feb. 9	1 I	17,730	*Kg Greizer*	27,518	0.21	1.35	2.08
D39	Moletta river, Feb. 16-19	56 I	9,761	*65 I/4 Pa*	21,478	0.67	1.88	4.56
Rome Campaign, May 11-June 4, 1944								
D49	Moletta offensive, May 23-24	*5 I*	17,345	4 Pa	12,569	0.59	2.43	1.92
D50	Anzio-Albano road, May 23-24	*1 I*	17,313	65 I	11,343	0.89	2.48	1.58
D57	Ardea, May 28-30	*5 I*	15,557	4 Pa	7,659	0.74	1.81	1.60
D60	Tarto-Tiber, June 3-4	*1/5 I*	38,011	4 Pa	10,855	0.60	2.36	2.44
28	*Average*	*7 div's*	*15,842*	*7 div's*	*11,465*	*0.65 (1.55)*	*1.30*	*2.42*
	Ratio		*1.38:*		*1*		*1:*	*1.87*
							0.54:	*1*

Notes: Italics = *attacking*; Pz = Panzer; I = Infantry; Gr = Grenadier; A = Armored; Kg = Kampfgruppe; b = British; Pa = Paratroopers; g = German

indicate that on the whole, the Germans were about 50 per cent more combat-effective than the British forces facing them. However, as Table III indicates, the British forces showed some signs of development and adaptation during the nine months under consideration. In the Salerno and Volturna campaigns (September-December 1943), the average CEV_g of 1.59 (or corresponding CEV_b of 0.63) appears to show the distinct combat advantages of the Germans (Gooderson, 2008; Graham and Bidwell, 1986). In the Anzio and Rome campaigns (January-June 1944), the average CEV_g decreases somewhat to 1.49 (with a corresponding CEV_b of 0.67), indicating a slight improvement in combat effectiveness of the British troops. This development coincides with a decrease in average numerical superiority of British over German forces from 85 to 2 per cent, providing further indication of British troops learning to fight more effectively in the face of stiff resistance.

The second measure, score effectiveness value (SEV), is not concerned with results and weapons, but simply counts the number of men and the daily number of casualties (killed, wounded, missing) on both sides of an engagement. From this, a score is calculated, indicating the average number of casualties inflicted on the enemy by blocks of 100 men on each side. The score effectiveness is calculated by dividing the score by a constant, the value of which depends on a number of interacting factors, of which posture (attack, delaying resistance, hasty defense, prepared defense, fortified defense) is the most important (Dupuy, 1985). As an example, a typical average engagement in the Second World War has division of forces as shown in Table IV (Dupuy, 1986, pp. 206-207).

During most of the Second World War, the Allied forces were the attacking party and the Germans delaying or defending. Because of the advantages of a defensive posture, the German score is divided by a constant of 2.0, yielding a German score effect (SE_g) of 2.0. The SEV of German versus Allied troops (SEV_g) then is 2.0:1.25 or 1.6:1 (the corresponding SEV_a is the reverse, namely, 1.25:2.0 or 0.63:1).

Campaigns	N_b/N_g	$CEV_{b(g)}$	SEV_b	SEV_g
Salerno & Volturna (September-December 1943, 17 engagements)	1.85: 1	0.63 (1.59)	0.99 1: 0.41:	2.44 2.47 1
Anzio & Rome (January-June 1944, 11 engagements)	1.02: 1	0.67 (1.49)	1.77 1: 0.74:	2.38 1.35 1
Average Ratio	1.38: 1	0.65 (1.55)	1.30 1: 0.54:	2.42 1.87 1

Table III. Development British–German battlefield performance over campaigns, 1943-1944

Army	*N*	Posture	No. casualties/day	% cas/day
German	10,000	Defense	250	2.5
Allied	20,000	Attack	400	2.0

AL Score Éffect (SE_a): GE cas/AL N 250/20,000 × 100 = 1.25
GE Score Effect (SE_g): AL cas/GE N 400/10,000 × 100 = 4.0/2.0 = 2.0

Table IV.

Applying this SEV formula to the 28 engagements between the British and German forces in Italy (Table II), the average SEV_g of 1.87:1 (or corresponding SEV_b of 0.54:1) seems to indicate that on a man-for-man basis, the German troops inflicted casualties at an average 87 per cent higher rate than they incurred from the opposing British troops. However, as Table III indicates, on this measure, the British forces showed signs of development and adaptation as well during the nine months under consideration. While in the Salerno and Volturna campaigns, the average SEV_g is 2.47 (with a corresponding SEV_b of 0.41), in the Anzio and Rome campaigns, the average SEV_g dropped to 1.35 (with a corresponding SEV_b of 0.74), providing another indication of clear improvement in battlefield effectiveness of the British troops.

Discussion and conclusions

In this paper, it has been argued that the British Army in the Second World War possessed only a moderate learning capability, which can be plausibly, but not exclusively, related to differences in battlefield performance between the British and the German Army. The British Army appears to present a relatively defensive learning cycle, which contrasts with the more productive learning cycle, found in the German Army, according to many military and historical researchers (Antal, 1993; Dupuy, 1984; Hart, 2001; Murray, 1992; Noble, 2003; Van Creveld, 1983; Visser, 2008, 2010; Wilson, 1989). In terms of the four dimensions of organizational learning capability, first, until 1944 in the German Army on the whole, officers and men were substantially empowered to independent decision-making and initiative taking ("Auftragstaktik"). Second, reporting of errors was valued and honestly appraised from the highest down to the lowest echelons. Third, lessons learned from these errors were quickly and thoroughly translated in training programs and practices and in updated doctrine and tactics, disseminated throughout the whole army. Finally, officers and men were thoroughly selected, trained and organized, primarily for front-line performance.

While these differences in organizational learning capability may be plausibly related to battlefield performance, numerous other factors (e.g. military, political, economical) have been influential as well. Thus, most historians would agree that its relatively productive learning cycle could not compensate for the basic strategic fact that Germany simply lacked the industrial, logistical and human resources to wage a prolonged two-front war against the combined Allied forces: Germany's defeat was virtually ensured after the entrance of the USA in the Second World War and the onslaught at Stalingrad (Beevor, 2012; Hart, 2001). This basic fact was duly reflected in Montgomery's tactics of engaging the Germans in attritional, massive set-piece battles, which in the long run, would exhaust the scarce German resources and detract from their relatively productive learning cycle (Buckley and Sheffield, 2014; Hart, 2007).

Regarding the concept of organizational learning capability, it proved possible to adapt it to government and nonprofit organizations in general and to army organizations in particular. For modern armies, the acquisition, retention and dissemination of "lessons learned" has acquired vital importance in this post-Cold War era of counterinsurgency and anti-terrorism fighting (Bijlsma *et al.*, 2010; Farrell, 2010; Foley *et al.*, 2011). The organizational capability to "detect and correct errors" and its

various dimensions, in their turn, are of vital importance to the effectiveness of "lessons learned" processes, as the British Army case in this paper suggests.

This importance of organizational learning capability and its dimensions also pertains to government and nonprofit organizations that appear to share some of the characteristics of armies, although often without considering themselves to be "army-like". Examples are prisons, correctional facilities, police forces, hospitals, mental institutions and fire departments. Like armies, such organizations regularly deal with emotionally intense emergency situations that often involve life–death issues, for the handling of which they display a recurrent need for clear hierarchical leadership and strong unit cohesion, combined with a need for flexibility and resilience. In terms of the four dimensions of organizational learning capability, first, such organizations need to resist ever-present tendencies toward top-down centralization and standardization, so that lower echelons retain meaningful decision-making discretion, and with that the opportunity to "learn lessons" from errors in decision-making. Second, such learning must be conducted in an open and productive learning climate to be really effective. Third, such learning must have direct implications for daily work practices, by embedding "lessons learned" in organizational memory systems, routines and practices, to reach all corners of the organization. Fourth, employees must be hired, trained and supported in meeting the challenges of their demanding "front-line" or "street level" duties (Visser and Van der Togt, 2015; Wilson, 1989)[2].

Finally, some caveats apply to the research presented in this paper. First, while a relationship between organizational learning capability and battlefield performance appears plausible, in this paper, it has not been conclusively demonstrated. Second, while the dimensions of organizational learning capability are discussed for the British Army as a whole, the battlefield analyses by Dupuy only pertain to six infantry divisions and one armored division at a particular time and place in the Second World War, which divisions may or may not have conformed to the general picture of the learning capability of the British Army at large.

Notes

1. For the description and analysis of the British Army and its battlefield performance, historical and military sources and data were repeatedly searched from February 2005 to September 2015 through search engines PiCarta, Web of Science, Google Scholar and Google, using the search terms "army organization", "British Army", "army performance" alone and in various combinations. References in the sources found were further checked for relevance and suitability for this paper.
2. In this respect, organizational learning capability and its dimensions shows similarities with characteristics of so-called high-reliability organizations: technologically complex organizations that can do great physical harm to themselves and its surrounding environment in case of errors (examples can be found in air traffic control, nuclear power generation, and naval carrier operations). High-reliability organizations create a mindful infrastructure and learning climate that is especially directed at tracking small errors, resisting oversimplification, remaining sensitive to operations, maintaining capabilities for resilience and taking advantage of shifting locations of expertise within the organization (Weick *et al.*, 1999; Weick and Roberts, 2007).

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Further reading

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About the author

Max Visser (PhD, University of Twente) is an Associate Professor at the Institute for Management Research, Radboud University, The Netherlands. His research interests include the relations between organizational learning, management control and performance, in particular in governmental and non-profit organizations. Further, he is interested in the relations between governance, performance and behavior in organizations, increasingly from a critical perspective. Max Visser can be contacted at: m.visser@fm.ru.nl