

# THE TROUBLE WITH JIT IN MILITARY OPERATIONS – A REVIEW

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*Abstract- Just-in-time ( JIT) supply has been credited with revolution rising the world's manufacturing industry by expediting delivery, eliminating waste and releasing capital from unnecessary stockholding. In the face of growing global threats and reducing domestic budgets, JIT is being advocated by many defence policy planners in both the US and the UK as the saviour of military logistics. Indeed, so high is political expectation on both sides of the Atlantic that JIT is rapidly becoming an article of faith. Consequently, there is a risk that it will be adopted as dogma, without any real understanding of its limitations.*

*Key Words:- JIT, war fighting, defence, logistics.*

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## I. INTRODUCTION

JIT, however, is not new. It has its origins in Japan at the Toyota Motor Company in 1954 where it was first introduced as a means of reducing wasteful overstocking in car production. It was more widely adopted in the 1970s and can be defined as: Producing the necessary units, with the required quality, in the necessary quantities, at the last safe moment. Or, more simply, it can be thought of as stockless logistics. It is now standard practice throughout manufacturing, particularly amongst major car and electronics producers in the US, Japan and Europe. The concept is well documented and derives from the tried-and-tested management principles of: demand 'pull' from the user/consumer; 'velocity' in delivery; and repetitive production. Recently, however, leading commercial practitioners and business academics (including Polito & Watson) have expressed reservations about its universal applicability. In the US, Cusumano and others have also highlighted its inherent vulnerability to catastrophes: extreme weather, political disorders, earthquakes, labour strikes, demand surges, raw material shortages, price instability and transportation delays. In the UK, the Department of Trade and Industry (DTI) website warns: 'Holding stock costs money but running out (of stock) can be disastrous'. With globalisation, outsourced production operations have become more exposed to worldwide disturbances, making JIT users increasingly vulnerable to risks of disruption amongst suppliers, no matter how small or how distant. In other words, industry has discovered that the trouble with JIT is that it can prove disastrous. Before adopting it without question, political leaders and defence planners would therefore be well advised to examine JIT extremely carefully in terms of its resilience under military conditions. This article seeks to explore some of the issues involved.

## 2. NATURE OF THE COMMERCIAL CONCEPT

Although there is nothing more practical than sound theory, no theory can be applied successfully without a profound understanding of its fundamental principles. The concept of JIT is simple enough, but commercial experience over the past 50 years has shown that success depends on six rules:

**Predictability:-** Predictability must be high – through the elimination of unexpected effects and creation of clearly defined, simple and continuous processes, based on well established procedures and effective production-smoothing in a stable operating environment. This is most likely to be achieved with localized supply systems, short-haul deliveries and short pipeline times.

**Partnership:-** Commercial relationships must be exceptionally good – based on mature and equitable partnerships with all suppliers throughout the supply chain and an unusual degree of trust.

**Total Visibility:-** Complete visibility is essential – successful JIT organizations require total visibility of all stocks, inventories and individual items at all times – from pre-manufacture to post consumption.

**Risk-based Planning:-** All risks must be known and mitigated – a rigorous, risk-based approach to planning is required whereby risks can be expressed in financial terms and either transferred to suppliers or offset by insurance.

**Financial Strength:-** All essential costs must be met – JIT is not cheap and users therefore require considerable financial strength for initial investment as well as maintenance and upgrading. Long-term financial commitment is also required for training and continuous improvement.

**Information Systems:-** Reliable information processing is essential management information and communications

systems that eliminate error-prone human intervention from routine decision making are vital.

### 3. CONDITIONS REQUIRED FOR JIT

Many forms of JIT are now practiced around the world, but the literature of all variants emphasises that success depends on the following conditions:

**Assured Demand:-** Advance knowledge of what consumers (users) will require: what types and what quantities must be delivered to whom and when; with what lead times; what volume of business and what cash flows will be generated. All forms of JIT are predicated on steady-state operations, and Karmarkar (a leading exponent) asserts that JIT cannot cope with rising demand. Aggarwal goes further and specifies that JIT systems break down under demand fluctuations of more than 10 per cent.

**Assured Supply:-** JIT organizations must have complete confidence that suppliers can guarantee supply, whenever it may be required. Japanese manufacturers have found that these ideas do not always export well. JIT also depends on certainty of supply prices and quality, as well as absolute priority over all other customers. Similarly, it relies on guaranteed, immediate access to raw materials and the long-term financial viability of every link in the supply chain.

**Assured Distribution:-** Transport and delivery from production to point of use must also be assured. This requires real-time consignment tracking throughout the delivery system. Nissan had to move away from pure JIT when it started experiencing delivery difficulties in congested urban areas as long ago as the 1970s.

**Assured Data:-** Reliable and up-to date inventory data are essential, as are constant asset tracking, stock visibility to the point of consumption, clarity of relative priorities and confidence in lead times.

**Assured Communications:-** JIT management depends on real-time, dedicated, constant, secure, uninterrupted, uncorrupted, global communications between all agents and all nodes of the supply chain, throughout the entire logistic system.

### 4. Contrast with Military Operations

What rapidly emerges from examination of industry practice and academic sources is that the stability required for successful JIT is extremely unusual in military organizations, particularly in wartime. Indeed, as Dixon and others have illustrated, even the best armies find that normal conditions for military operations tend to be characterized by:

- Confused, ill-defined and rapidly changing requirements – including the short-notice deployment of nonstandard equipment as Urgent Operational Requirements (UOR).
- Unexpected, unpredictable and one-off scenarios.
- Human error.
- Short-notice demand surges.
- Frequent ad hoc planning and improvisation.
- Complex management systems dependent on long lines of communication.

- Poor, incomplete, unreliable and constantly changing information.
- Hostile enemy action resulting in interference, losses and attrition.
- Significant political, human and other non-financial risks.
- Importance of endurance and the value of ‘mass’, resilience, flexibility and just-in-case planning with logistic ‘push’ for pre-deployment build-up and preparation.

Typical imponderables for battle logistics are likely to include: how many replacement 155mm artillery barrels will be required and when? How much small arms ammunition? How much replacement track? How many final drives, radio batteries and air filters? None of these, or thousands of other warlike stores, will be available from permanently running, steady-state production lines. Whether even regular suppliers can meet maximum surge demands will be questionable. And in any case, lead-times and prices will be unknown.

### 5. CONCLUSIONS ON SUITABILITY OF JIT

So, the real trouble with JIT for is that the fundamental principles on which the concept is based are critically dependent on demand stability and steady-state production conditions. Furthermore, its basic premise relies on accurate trend analysis for effective lead-time management, without which JIT can lead to disastrous consequences. These underlying conditions are almost unknown in military operations, except perhaps for routine basic training and some forms of peacekeeping duties. It is therefore difficult to reach any conclusion other than JIT for warfighting is most unlikely to succeed.

It is, after all, a commercial concept. Defence planners should not be surprised to find that the military imperatives of fighting and winning will differ significantly from the buying behaviour of civilian consumers. And for reliable JIT, this matters. It must be concluded, therefore, that the utility of JIT for military logistics is going to be highly questionable at best and prone to dangerous weaknesses in terms of:

1. Predictability and stability of requirements.
2. Integrity of information.
3. End-to-end visibility of items in the supply chain.
4. Effects of enemy interference.
5. Impact and probability of nonfinancial risks.

This conclusion suggests that current faith in stockless military JIT may not be the result of full and objective analysis. In fact, it may represent little more than a pious hope born of parsimony and incomplete understanding. Even in the purest commercial JIT systems, practitioners have found it necessary to establish safety stocks and buffers at critical points along the supply chain to reduce the risk of catastrophic non availability. Unless these empirical lessons are learned, and military JIT thinking adapted appropriately for resilience under enemy attack, the prospects of military disaster must be severe. The lessons of recent operations in Iraq would appear to confirm this conclusion. Worryingly, though, defence planners in the US and the UK seem to believe that JIT can eliminate the cost and the burden of ‘just-in-case’ contingency stocks throughout the military supply

system. Fifty years of commercial JIT experience suggests that such thinking is dangerous folly.

### **Way Forward:-**

So how should the US and the UK proceed with their 'Revolution in Military Logistics' (RML) and 'End-to-End' (E2E) logistic reviews? Is it really just a question of pitting the costs of logistic 'mass' against the risks of 'velocity'? Or weighing the merits of 'push' against 'pull' supply theory? Is it a contest between traditional, expensive stock management and modern, efficient JIT? Does it simply boil down to a choice of one or the other? In practice, the answer to all these questions must be no. Both systems have much to offer, and military logisticians must be smart enough to incorporate the best of both, without becoming over dependent on either. The most critical questions for the support of warfighting therefore revolve around uniquely military risks. These arise from unreliable lead times, effects of enemy action and non-availability of buffer stocks. Where in the supply chain are buffers and reserves required? How much of what should be held? How should it be controlled and by whom? Can reliable suppliers for surges be found? What alternatives are available? How can buffers be designed to accommodate known variables such as peak demand and unavoidable bottlenecks in the supply chain? In other words, how can they mitigate all likely mission-critical risks? Bleakley reports that after Bollinger Industries' successful introduction of JIT, some stock inventories had to be increased by 30 per cent to satisfy fluctuations in customer demand. In the E2E review, such issues must be addressed in terms of military judgement and fighting power, not wishful thinking and financial expediency. Winning battles requires unequivocal commitment to provision in terms of instant delivery of ammunition, spares and other vital consumables. If this means creating reserves and holding stock forward – 'just in case' – then so be it. It follows, therefore, that to avoid self-delusion and the consequent risk of disaster, planning for the US's RML and the UK's Defence Logistics Transformation Programme must be informed by pragmatic, military-led, risk-based analysis of all possible scenarios, contingencies and choke points. Procurement realism must also be rigorously applied to test suppliers' ability to meet unexpected demand surges.

The real test of JIT is not how it performs when things go well, but what happens when they go wrong. The result of this analysis must be properly reflected in buffer stocks and designed into the military logistic system's integral capability to cope with unexpected events and challenging scenarios, especially short-notice deployments under hostile conditions. Operational experience must lead the planning process, and sound military judgement must prevail over political dogma and misapplied industrial concepts. Only in this way can defence logisticians genuinely learn from commercial experience without being bamboozled by it. In the end, the application of JIT may never extend beyond non-military consumables, peacetime training, routine garrison duties and stable peacekeeping operations.

Ultimately, the trouble with JIT in the defence context is that military success is subject to too many capricious variables, and the vital delivery can switch from 'just in time', to 'just too late' in a single instant. In that critical

moment, the success and failure of great events hang in the balance. This type of danger may be manageable in the commercial world, where risks can be transferred and financial consequences insured against, but if JIT adds to the hazards of a military operation, why would any commander wish to take such a gamble, especially if it were predicated on inadequate analysis and incomplete understanding? Toyota would not do it.

### **REFERENCES**

1. Karmarkar, U: Getting Control of JIT. *Harvard Business Review*, 67(5), 1989.
2. Aggarwal, S: Making Sense of Production Operations Systems, *Harvard Business Review*, 63(5), 1985.
3. Norris, F: Inventories are Rising for the Right Reasons, *The New York Times*, 31 July 1994.
4. Polito, A & Watson, K: JIT Under Fire, *Proceedings of 2001 International Business & Economics Research Conference*, Article 417.
5. Cusumano, M: The Limits of 'Lean', *Sloan Management Review*, 35(4), 1994.
6. Bleakley, F: JIT Inventories Fade in Appeal as the Recovery Leads to Rising Demand, *The Wall Street Journal*, 25 October 1994.
7. Goddard, W: Kanban Versus MRP2, *Modern Materials Handling*, 5 November 1982.
8. McGillivray, G: Commercial Risk under JIT, *Canadian Underwriter*, January 2000.
9. Robinson, P: *Business Excellence: the Integrated Solution to Planning and Control*, Hove: BPI, 1997.
10. Karoo, R: *Focused Logistics*, 2001, [www.rickard.karoo.net](http://www.rickard.karoo.net). UK MoD: *Delivering Security in a Changing World*, Defence Command Paper CM 6269, 2004.
11. UK MoD: *Operations in Iraq: Lessons for the future*, 2003, Ch 8 – Logistics.
12. NATO Logistics Forum: *Proceedings of January 2003 Conference*.
13. Bamfield, R: *Smarter Logistics within MoD (UK)*, *The Source*, Public Management Journal, 1999.
14. Foxton, P: *The Future for the British Defence Industry*, RCDS paper, 1996.
15. Smith, L: *Commercial Logistics Best Practices for the Revolution in Military Logistics*, 1999, [www.almc.army.mil](http://www.almc.army.mil).
16. Piggee, A: *Transformation – Revolution in Military Logistics*, US Army War College Strategy Research Project, 2002.
17. Dixon, N: *On the Psychology of Military Incompetence*, *Futura*, 1976.
18. *The CRC handbook of mechanical engineering*, second edition, Edited by Frank Kreith and D. Yogi Goswami, 2004, ISBN 0-8493-0866-6.
19. *Mechanical Engineering Handbook*, Edited by Frank Kreith, CRC Press, 1999.
20. *Springer Handbook of Engineering Statistics* by Hoang Pham, Springer-Verlag London Limited, 2006, ISBN-10: 1852338067