



A TEMPLATE FOR BUILDING AN INTEGRATED MULTISECTOR SMART LOGISTICS ECOSYSTEM

Authored by

Salma Abbasi
*Chairperson and CEO, eWorldwide Group and
Vice Chair, Digital Resilience Initiative, IEEE*

Rezwanul Haque Jami
*Head of eCommerce, a2i, ICT Division
People's Republic of Bangladesh*

Md Sahariar Hasan Jiisun
*National Consultant, a2i, ICT Division
People's Republic of Bangladesh*

TRADEMARKS AND DISCLAIMERS

IEEE believes the information in this publication is accurate as of its publication date; such information is subject to change without notice. IEEE is not responsible for any inadvertent errors.

The ideas and proposals in this specification are the respective author's views and do not represent the views of the affiliated organization.

ACKNOWLEDGMENTS

Special thanks are given to the following reviewers of this paper:

Anir Chowdhury, *a2i, Bangladesh*

Ashirwad Tripathy, *Educating Nepal, Nepal*

Augustin Cyiza, *AeTrade Group, Rwanda*

Iffat Jahan Pithia, *a2i, Bangladesh*

Shabiba Benta Habib, *Assistant Manager, BRAC*

Sumeet Bhardwaj, *DP World Kigali, Rwanda*

Tawfique Ahmed, *a2i, Bangladesh*

The Institute of Electrical and Electronics Engineers, Inc. 3 Park Avenue, New York, NY 10016-5997, USA

Copyright © 2023 by The Institute of Electrical and Electronics Engineers, Inc.

All rights reserved. 8 September 2023. Printed in the United States of America.

PDF: STDVA26418 979-8-8557-0057-2

IEEE is a registered trademark in the U. S. Patent & Trademark Office, owned by The Institute of Electrical and Electronics Engineers, Incorporated. All other trademarks are the property of the respective trademark owners.

IEEE prohibits discrimination, harassment, and bullying. For more information, visit <http://www.ieee.org/web/aboutus/whatis/policies/p9-26.html>.

No part of this publication may be reproduced in any form, in an electronic retrieval system, or otherwise, without the prior written permission of the publisher.

Find IEEE standards and standards-related product listings at: <http://standards.ieee.org>.

NOTICE AND DISCLAIMER OF LIABILITY CONCERNING THE USE OF IEEE SA INDUSTRY CONNECTIONS DOCUMENTS

This IEEE Standards Association (“IEEE SA”) Industry Connections publication (“Work”) is not a consensus standard document. Specifically, this document is NOT AN IEEE STANDARD. Information contained in this Work has been created by, or obtained from, sources believed to be reliable, and reviewed by members of the IEEE SA Industry Connections activity that produced this Work. IEEE and the IEEE SA Industry Connections activity members expressly disclaim all warranties (express, implied, and statutory) related to this Work, including, but not limited to, the warranties of: merchantability; fitness for a particular purpose; non-infringement; quality, accuracy, effectiveness, currency, or completeness of the Work or content within the Work. In addition, IEEE and the IEEE SA Industry Connections activity members disclaim any and all conditions relating to: results; and workmanlike effort. This IEEE SA Industry Connections document is supplied “AS IS” and “WITH ALL FAULTS.”

Although the IEEE SA Industry Connections activity members who have created this Work believe that the information and guidance given in this Work serve as an enhancement to users, all persons must rely upon their own skill and judgment when making use of it. IN NO EVENT SHALL IEEE OR IEEE SA INDUSTRY CONNECTIONS ACTIVITY MEMBERS BE LIABLE FOR ANY ERRORS OR OMISSIONS OR DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO: PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS WORK, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE AND REGARDLESS OF WHETHER SUCH DAMAGE WAS FORESEEABLE.

Further, information contained in this Work may be protected by intellectual property rights held by third parties or organizations, and the use of this information may require the user to negotiate with any such rights holders in order to legally acquire the rights to do so, and such rights holders may refuse to grant such rights. Attention is also called to the possibility that implementation of any or all of this Work may require use of subject matter covered by patent rights. By publication of this Work, no position is taken by the IEEE with respect to the existence or validity of any patent rights in connection therewith. The IEEE is not responsible for identifying patent rights for which a license may be required, or for conducting inquiries into the legal validity or scope of patents claims. Users are expressly advised that determination of the validity of any patent rights, and the risk of infringement of such rights, is entirely their own responsibility. No commitment to grant licenses under patent rights on a reasonable or non-discriminatory basis has been sought or received from any rights holder. The policies and procedures under which this document was created can be viewed at <http://standards.ieee.org/about/sasb/iccom/>.

This Work is published with the understanding that IEEE and the ICom members are supplying information through this Work, not attempting to render engineering or other professional services. If such services are required, the assistance of an appropriate professional should be sought. IEEE is not responsible for the statements and opinions advanced in this Work.

TABLE OF CONTENTS

1. INTRODUCTION	5
2. PLAYERS IN THE SMART LOGISTICS ECOSYSTEM	6
2.1. GOVERNMENTAL AND INTERGOVERNMENTAL INSTITUTIONS	6
2.2. LOGISTICS INFRASTRUCTURE AND EQUIPMENT PROVIDERS	7
2.3. LOGISTICS SERVICE PROVIDERS	7
3. RESOURCES FOR THE LOGISTICS INDUSTRY	8
3.1. HUMAN RESOURCES: TRAINING INSTITUTIONS AND UNIVERSITIES	9
3.2. FINANCIAL RESOURCES: BANKS, FINANCIAL INSTITUTIONS, AND FINTECH COMPANIES	9
3.3. STARTUP ECOSYSTEM: VENTURE CAPITAL FIRMS, ACCELERATORS, AND INCUBATORS	10
3.4. RISK MITIGATION: INSURANCE COMPANIES	10
3.5. DIGITAL SOLUTIONS: TECH PROVIDERS	10
3.6. INDUSTRY STANDARDS: STANDARDS ORGANIZATIONS, INDUSTRY ALLIANCES, AND ASSOCIATIONS	10
4. DIGITAL TRANSFORMATION—NEW PLAYERS	11
4.1. E-COMMERCE GIANTS	12
4.2. LOGISTICS STARTUPS	13
4.3. RIDE-HAILING STARTUPS	13
5. LOGISTICS USERS	14
5.1. GOVERNMENT OF MALAYSIA	14
5.2. BANGLADESH LOGISTICS SERVICE STARTUP	15
5.3. ZIPLINE	16
5.4. DHL	17
6. TEMPLATE FOR HOLISTIC MULTISECTOR COLLABORATIONS FOR SMART LOGISTICS	18

A TEMPLATE FOR BUILDING AN INTEGRATED MULTISECTOR SMART LOGISTICS ECOSYSTEM

1. INTRODUCTION

The logistics industry is facing an era of unprecedented change, driven by the effects of COVID-19, rapid growth in e-commerce, a global economic recession, trade wars, changing customer expectations, climate change, and rapid digitalization. During the COVID-19 pandemic, we have witnessed massive delays in the movement of goods and surges in logistics costs, resulting in shortages of medical supplies, food, and other necessities worldwide. With the increasingly complex, cascading, and overlapping impacts of natural disasters, economic and political crises, and epidemics, there is an urgent need for a **resilient and sustainable smart logistics ecosystem**.

It needs to be **resilient** to be able to recover quickly from crises and disasters and function optimally to deliver essential supplies and basic necessities, particularly to those most vulnerable living in rural and remote areas. It needs to be **sustainable** such that the optimal functioning of the logistics ecosystem does not jeopardize the well-being of people and the environment, which means ensuring that jobs in the logistics industry are decent and safe, using clean energy, and eliminating pollution and greenhouse gas emissions across the logistics supply chain. **Smart** implies effectively leveraging digital technologies for improved resilience and sustainability of logistics systems. For example, the use of industrial Internet of Things, blockchain, and dashboards can provide real-time visibility and transparency of order status, sourcing practices, and environmental impact, and enable faster response to unforeseeable disruptions.

In this paper, logistics involves the management of the flow of goods, resources, and information between the point of origin and the destination. It is the process of planning, optimizing, and implementing the transportation of goods by air, rail, road and/or sea, and the warehousing, which includes receiving and recording goods from different suppliers, storing goods at appropriate locations, retrieving and picking goods when they are needed, and preparing shipment to customers. Logistics is a subset of supply chain management, which focuses on the physical movement of goods and the relevant information flow.¹

¹ Xu Sun et al., "The application of Industry 4.0 technologies in sustainable logistics: a systematic literature review (2012–2020) to explore future research opportunities," *Environmental Science and Pollution Research International*, vol. 29, no. 7 (2022), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8664234/>.

This paper is part of a five-part series of papers on integrated multisector smart logistics. This paper focuses on best practices and guidelines for ensuring resilient and sustainable food supply chain systems during crises and emergencies.

2. PLAYERS IN THE SMART LOGISTICS ECOSYSTEM

Players in the smart logistics ecosystem are becoming increasingly diverse. They can be divided into six key categories: (1) governmental and intergovernmental institutions; (2) logistics infrastructure and equipment providers; (3) logistics service providers; (4) resources for the logistics industry; (5) new players in the logistics ecosystem; and (6) logistics users. Each of these categories is discussed next.

2.1. GOVERNMENTAL AND INTERGOVERNMENTAL INSTITUTIONS

Government regulations, trade agreements, and global rules and guidelines of the International Maritime Organization (IMO), United Nations Conference on Trade and Development (UNCTAD), World Customs Organization (WCO), and World Trade Organization (WTO) play an important role in influencing the growth and strategies of logistics players in the ecosystem and the flow of trade within and across borders.

For example, during the COVID-19 pandemic, we have witnessed the hoarding of vaccines and essential medical supplies through export restriction policies that have resulted in those most vulnerable without the means to protect themselves from the virus. On the other hand, incentives and tax relief can accelerate digitalization and promote collaboration among competitors to develop solutions to logistical challenges, and governments' commitment to climate action can promote a more environmentally friendly and sustainable logistics system.

Government policies and strategies are important in directing investments in air, road, rail, and port infrastructure, developing logistics parks and hubs, climate-proofing logistics infrastructure against extreme weather and sea-level rise to build their resilience, and decarbonizing the logistics supply chain by promoting the use of renewable energy and electrification of rail and vehicles.

The efficiency of customs and border management clearance is also important in facilitating the flow of goods across borders. Excessive and opaque procedural requirements and repeated inspections of goods by multiple

agencies can lead to significant delays and affect the competitiveness of countries and the ability to trade internationally. This is further discussed in the second paper in the series.

2.2. LOGISTICS INFRASTRUCTURE AND EQUIPMENT PROVIDERS

Logistics infrastructure providers are the air freight companies, rail companies, truck companies, and ocean freight companies that own or lease their fleets to transport goods by air, rail, road, and sea, respectively.

Air freight companies transport goods with dedicated air freight carriers or using the belly hold capacity of passenger aircraft. Rail companies transport goods and containers across the rail network on specialized locomotives and carriages. Truck companies transport shipping containers or other cargo on trucks or trailers. Ocean freight companies transport shipping containers on container vessels.

The equipment providers manufacture, own, or lease the containers and other assets needed to transport goods.

Logistics infrastructure providers also include airport terminals and ocean port operators, warehouses, and distribution centers where goods are sent, received, handled, processed, and managed for onward logistics. One example would be an ocean port where products are transferred from a container ship to trucks for onward transport to warehouses.

Some countries are investing in logistics parks and hubs to enhance efficiency and reduce logistics costs for companies. They are designed for storage, management, distribution, and transportation of goods within which logistics service providers collaborate to offer value-added services by sharing assets.

2.3. LOGISTICS SERVICE PROVIDERS

There is a wide range of logistics service providers that administer and manage goods as they flow along the supply chain. They may provide services for all or part of the supply chain.

The most well-known logistics service providers are the international express incumbents such as DHL, FedEx, and UPS. They are also known as international freight forwarding companies that organize shipments for individuals and corporations. These companies enter into contracts with the logistics infrastructure providers