



DPC: 25/30509512 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

Date: 21 August 2025

Origin: International

Latest date for receipt of comments: 14 October 2025

Project No. 2025/00358

Responsible committee: AMT/4 Industrial data and manufacturing interfaces

Interested committees:

Title: Draft BS ISO 24644-1 Mass customization value chain management. Part 1: Framework.

Please notify admin.start@bsigroup.com if you are aware of any keywords that might assist in clarifying or identifying the standard or of the content of this standard:

- i) has any issues related to 3rd party IPR, patent or copyright
- ii) affects other national standard(s)
- iii) requires additional national guidance or information

WARNING: THIS IS A DRAFT AND MUST NOT BE REGARDED OR USED AS A BRITISH STANDARD. THIS DRAFT IS NOT CURRENT BEYOND 14 October 2025

This draft is issued to allow comments from interested parties; all comments will be given consideration prior to publication. No acknowledgement will normally be sent. **See overleaf for information on the submission of comments.**

No copying is allowed, in any form, without prior written permission from BSI except as permitted under the Copyright, Designs and Patent Act 1988 or for circulation within a nominating organization for briefing purposes. Electronic circulation is limited to dissemination by e-mail within such an organization by committee members.

Further copies of this draft may be purchased from BSI Shop <http://shop.bsigroup.com> or from BSI Customer Services, Tel: +44(0) 20 8996 9001 or email cservices@bsigroup.com. British, International and foreign standards are also available from BSI Customer Services.

Information on the co-operating organizations represented on the committees referenced above may be obtained from <https://standardsdevelopment.bsigroup.com/>.

E-mail: admin.start@bsigroup.com

Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
------------------	------------------------

1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



DRAFT International Standard

ISO/DIS 24644-1

Mass customization value chain management —

Part 1: Framework

*Management de la chaîne de valeur de la personnalisation de
masse —*

Partie 1: Cadre

ICS: 25.040.40

ISO/TC 184/SC 5

Secretariat: **ANSI**

Voting begins on:
2025-08-21

Voting terminates on:
2025-11-13

This document is circulated as received from the committee secretariat.

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENTS AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

Reference number
ISO/DIS 24644-1:2025(en)

Full document details: 25/30509512 DC

© ISO 2025



Documents

Document Sharing Hub



COPYRIGHT PROTECTED DOCUMENT

© ISO 2025

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Abbreviated terms	2
5 Mass customization value chain management overview	3
6 Framework model	4
6.1 General description of the framework model	4
6.2 Framework model domain	5
7 Functional model	7
7.1 Functional model notation	7
7.2 General description of functional model	8
7.3 Interaction	9
7.4 R&D	10
7.5 Marketing and sales	12
7.6 Sourcing and planning	13
7.7 Production	14
7.8 Logistics	15
7.9 Service	16
7.10 QHSE management	17
7.11 Data management	18
8 Information flow of mass customization	18
Annex A (informative) Mass customization value chain management — Consumer electronics industry	21
Annex B (informative) Mass customization value chain management — Iron and steel industry	27
Annex C (informative) Mass customization value chain management — Electrical industry	31
Annex D (informative) Mass customization value chain management — Reverse customization	34
Annex E (informative) Mass customization value chain management — Automotive industry	37
Bibliography	39

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 184, *Automation systems and integration*, Subcommittee SC 5, *Interoperability, integration, and architectures for enterprise systems and automation applications*.

A list of all parts in the ISO 24644 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Along with the generalization and popularization of Internet technologies, Internet of Things (IoT), flexible manufacturing technologies and modern logistics, individualized customization services have become embedded into all industrial and service sectors. Users can, by means of Internet platforms, determine and customize their own products upon their own demands. Mass customization is becoming a new mode in the manufacturing industry, and value chains will be ultimately driven by the users. Cooperation among enterprises is required by utilizing quick-response Internet platforms to provide a wide range of products and services in small lots to satisfy the users with various individualized demands.

From the user's perspective, as the users directly interact with enterprises for customized products, they desire to participate in the creation process of their individualized product and also to obtain or receive information about the progress of the product.

From the enterprise perspective, mass customization will assist the enterprises in realizing the real-time and accurate understanding of the user's demands. Customized products increase the premium value of products for enterprises. Because of accurately estimated *a priori* information from customized product demand and requirements from the users, the enterprises can reduce or eliminate the inventory-related costs by appropriately conducting large-scale procurement or production.

Mass customization value chain management —

Part 1: Framework

1 Scope

This document specifies a framework for mass customization value chain management, including the framework model, functions and information flow of mass customization. This document does not describe interoperability at a system level or interoperability throughout the life cycle in detail.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

domain

functional area

[SOURCE: ISO 24097-1:2017 [\[1\]](#), 3.1.2, modified — “in a policy assertion” has been deleted from the definition. The EXAMPLE has been deleted.]

3.2

information flow

transfer of information from an information-source-object to an information-destination-object

[SOURCE: ISO/IEC 16500-1:1999 [\[2\]](#), 3.30]

3.3

interaction

exchange of information between a user and a system via the human-system interface to achieve the intended goal

[SOURCE: EN ISO 11064-5:2008 [\[3\]](#), 3.20]

3.4

mass customization

production mode that provides customized products and services according to the individualized demands of users with the cost and efficiency in mass production

3.5

user experience

person's perceptions and responses resulting from the use and/or anticipated use of a product, system or service

[SOURCE: ISO/IEC 30071-1:2019 [\[4\]](#), 3.1.6]

3.6

value-added service

service that is offered in addition to the core service in question thus creating additional value

[SOURCE: ISO/TS 17573-2:2020 [\[5\]](#), 3.231]

3.7

value chain

range of activities or parties that create or receive value in the form of products or services

[SOURCE: ISO 22948:2020 [\[6\]](#), 3.2.11]

3.8

product scheme

product solutions designed according to user customization demands

3.9

social community

a collective organization where people with common interests, goals, or values come together social

Note 1 to entry: A social community can be physical communities based on geographic areas, or online communities such as social networking groups.

3.10

Computer Aided X CAX

a comprehensive term for various computer-aided technologies such as CAD, CAM, CAE, CAPP, CIM, CAS, CAT, CAI, etc.

3.11

intelligent interaction engine

Software integrating with enterprise systems, supporting information exchange between users and enterprise systems to meet user needs or complete the intended task

4 Abbreviated terms

For the purposes of this document, the following abbreviated terms apply.

APS	Advanced Planning and Scheduling
BOM	Bill of Material
B2B	Business to Business
CAX	Computer Aided X
CP	Configuration Partner
CRM	Customer Relationship Management
CTO	Configure to Order
DTS	Delivery to Service

ENDO	Bare unit on which customization can be configured through assembly. Transceiver is set in working assembly form.
ERP	Enterprise Resource Planning
EVI	Early Vendor Involvement
FIFO	First-In-First-Out
MRP	Material Requirements Planning
CTO	Concept to Order
OTD	Order to Delivery
PLM	Product Lifecycle Management
QHSE	Quality, Health, Safety, and Environment
TMS	Transportation Management System
WMS	Warehouse Management System

5 Mass customization value chain management overview

For mass customization value chain management, the value activities of mass customization can be divided into domains from the perspective of life cycle and system, and the contents of each activity and the information transmitted between activities should be clearly defined. The framework of mass customization value chain management consists of an activity interaction model, activity definitions, and identification of general information flows. This document falls in the constructs of function view, according to the definition of enterprise activity and function view in ISO 19439.

NOTE 1 According to ISO 19439:2006 [\[7\]](#) 5.3.2, "the function view shall represent the business processes of the enterprise domain, their functionality, behaviour, inputs and outputs. The function view shall describe the assembly of single processing steps as a collection of processes (business processes and enterprise activities) structured as a network of activities reflecting their logical connection and interdependencies."

NOTE 2 According to ISO 19439:2006 [\[7\]](#) 3.19, enterprise activity is "all, or part, of process functionality that consists of elementary tasks performed in the enterprise that consume inputs and allocate time and resources to produce outputs."

With the definitions and concepts of enterprise activity and function view, the framework is generated referring to the enterprise modelling concepts defined in ISO 19439:2006 [\[7\]](#), which conforms with the requirement of ISO 15704:2019 [\[8\]](#). Specifically, the framework corresponds with the domain identification, concept definitions and requirements definition of the function view at the generic level as shown in the dash area of [Figure 1](#)¹⁾. The modelling concepts are reused in ISO 19440:2020 [\[9\]](#), which is built upon ISO 19439:2006 [\[7\]](#), to identify and specify constructs necessary for users that model enterprises.

1) [Figure 1](#) is excerpted from ISO 19439:2006 [\[7\]](#), and it is Figure 5 in ISO 19439:2006 [\[7\]](#).

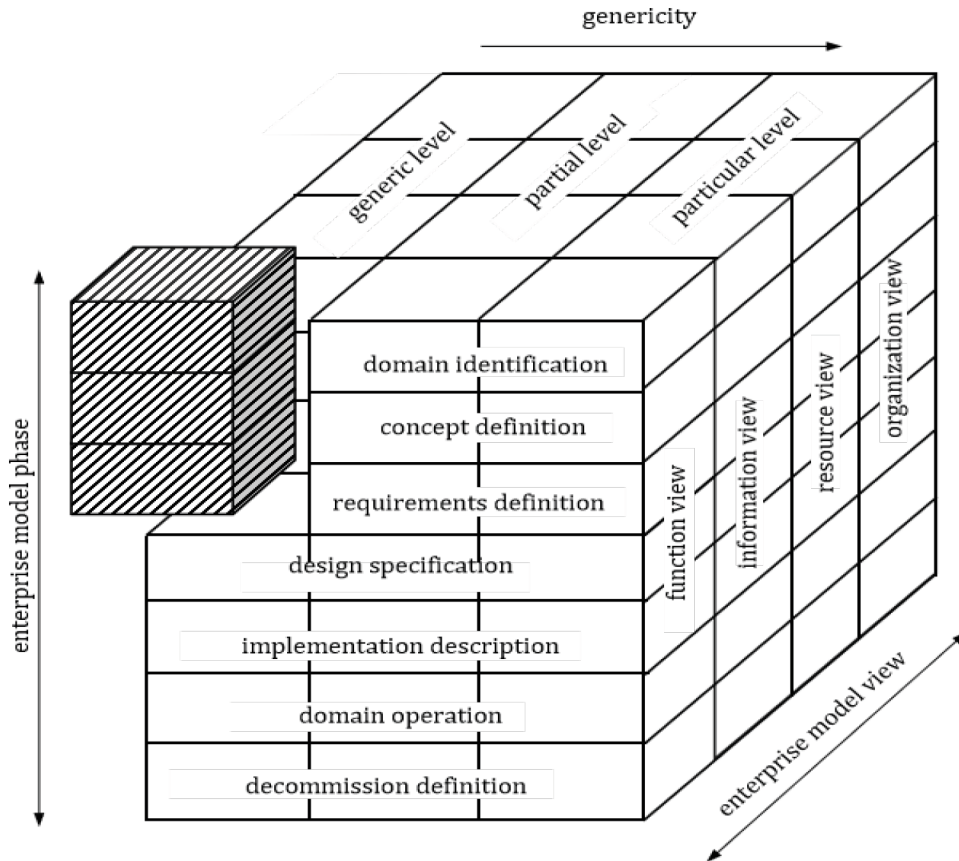


Figure 1 — Overview of the framework for enterprise modelling

6 Framework model

6.1 General description of the framework model

The framework model of mass customization consists of two dimensions, namely system level and life cycle. The vertical axis in [Figure 2](#) presents the system level, which includes equipment layer (EML), control layer (CTL), workshop layer (WSL), enterprise layer (EPL), and collaboration layer (CBL) based on IEC 62264-1:2013 [\[10\]](#). The horizontal axis in [Figure 2](#) covers the whole life cycle of a product, which includes seven activities, i.e., interaction, research and development (R&D), marketing and sales, sourcing and planning, production, logistics, and service.

System level in [Figure 2](#) is divided into five layers according to the organizational structure related to enterprise production activities, in which:

MEL is applied by an enterprise to realize the actual physical process, and perceive and operate it by means of sensor, instrument, machine and device and others;

CTL is used for handling information, and realizing the monitoring and controlling physical process within an enterprise;

WSL is applicable for realizing production management within a factory or a workshop;

EPL aims to realize enterprise oriented business management; and

CBL is applied to realizing the interconnectivity and sharing of internal and external information in an enterprise and the business coordination between enterprises.

Mass customization domains include concept-to-order (CTO) domain, order-to-delivery (OTD) domain, and delivery-to-service (DTS) domain.

As shown in [Figure 2](#), the CTO domain covers four activities from the life cycle, i.e., interaction, R&D, marketing and sales, and sourcing and planning, and it contains WSL and CBL from the system level.

The OTD domain includes the production activity and logistic activity. In the production activity, it covers the EML, CTL, WSL and EPL. In the logistics activity, it includes all five system layers.

The DTS domain covers the service activity from the life cycle, and contains the EPL and CBL from the system level.

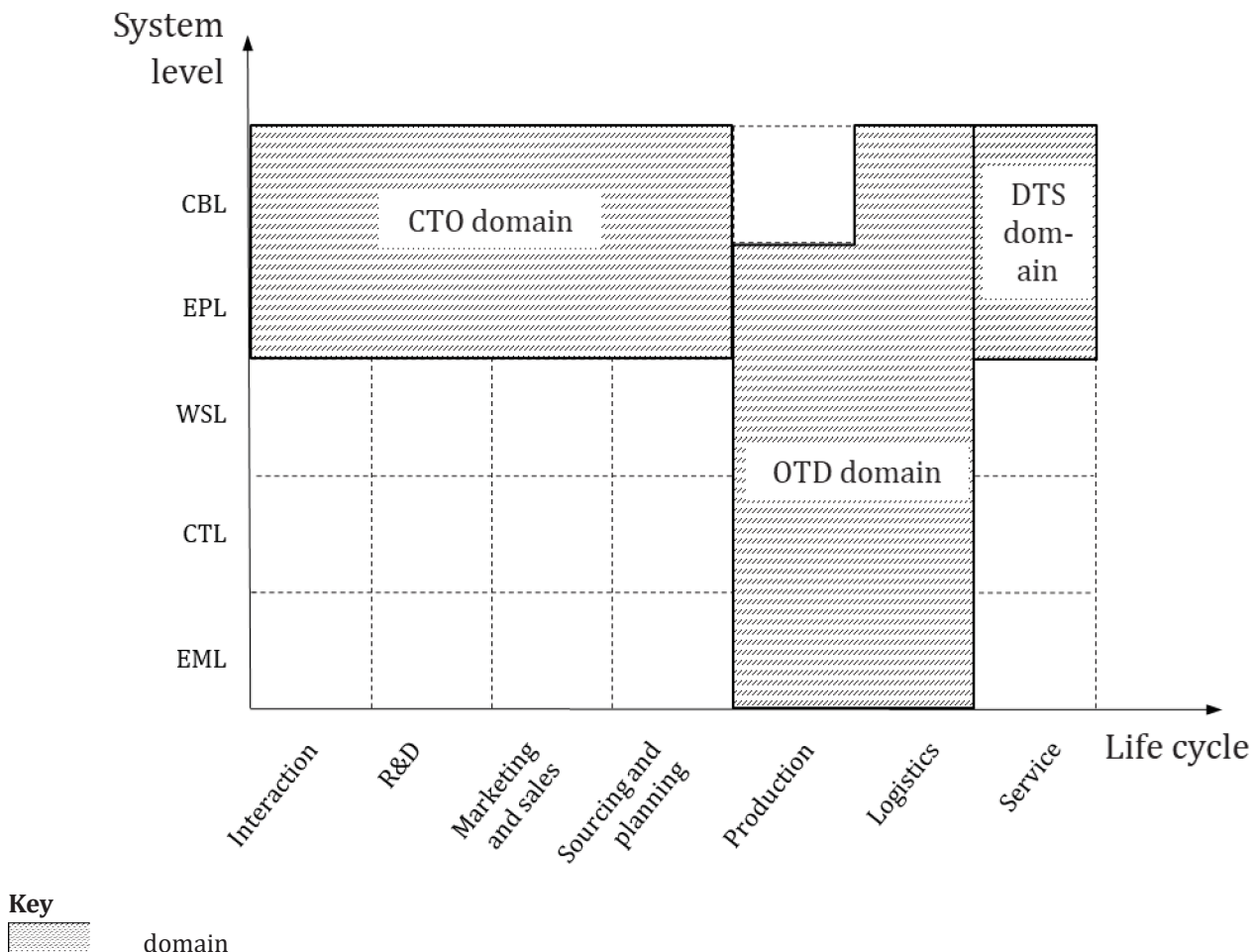


Figure 2 — Mass customization domains

6.2 Framework model domain

In the CTO domain, enterprises shall focus on user demands, output product schemes through the interaction and R&D activities. User orders are generated through the marketing and sales activity. Enterprises arrange a master production schedule according to the product scheme and the user orders, and find suitable suppliers through the sourcing and planning activity to ensure commodity²⁾ supply. The contents of a user order include user basic information, customization information, expected delivery date and place, product model, payment information, etc.

In the interaction activity, enterprises collect user demands, and interact with users and ecosystem partners, conduct user demands analysis and screening, and output customized demands. The interaction methods include user interface, network (e.g., users' interactions with enterprises via surfing the Internet by

²⁾ In this document, commodity includes raw material and purchasing parts from suppliers.

using the platforms such as Google, Yahoo, etc.), social networking (e.g., users' interaction with enterprises through the social media such as WeChat, Facebook, etc.), web, apps, etc.

In the R&D activity, enterprises conduct customized demands classification, assessment, and transformation, and output product solutions after simulation verification. If customized demands cannot be achieved, enterprises should provide timely feedback to users.

In the marketing and sales activity, enterprises conduct product positioning and pricing, and this activity should obtain user orders through precision marketing.

In the sourcing and planning activity, enterprises find suitable material suppliers for source searching demands and procurement demands.

In the OTD domain, factories conduct the production activity to produce customized products, and deliver them to users through the logistics activity.

In the production activity, factories arrange a detailed production plan according to the master production schedule and material status (including material in stock or its expected arrival time), and this activity shall execute manufacturing according to the detailed production plan.

In the logistics activity, enterprises arrange reasonable a delivery route and deliver the customized products to the designated place at the appointed time through logistics management.

In the DTS domain, enterprises obtain user experience information through the service activity, and the analysis of conduct online or offline diagnosis to get the status information of products, and this activity should provide after-sales and value-added services for users. Enterprises should promote the recycling of customized products.

The user experience information and new demands obtained from the DTS domain get the fed back to the MTO domain and OTD domain to promote product optimization and iteration.

[Figure 3](#) depicts mass customization domains, elements and functions, and information flow showing the interaction between the users and domains, pictorially summarizing the dynamics of the CTO, OTD, and DTS domains.

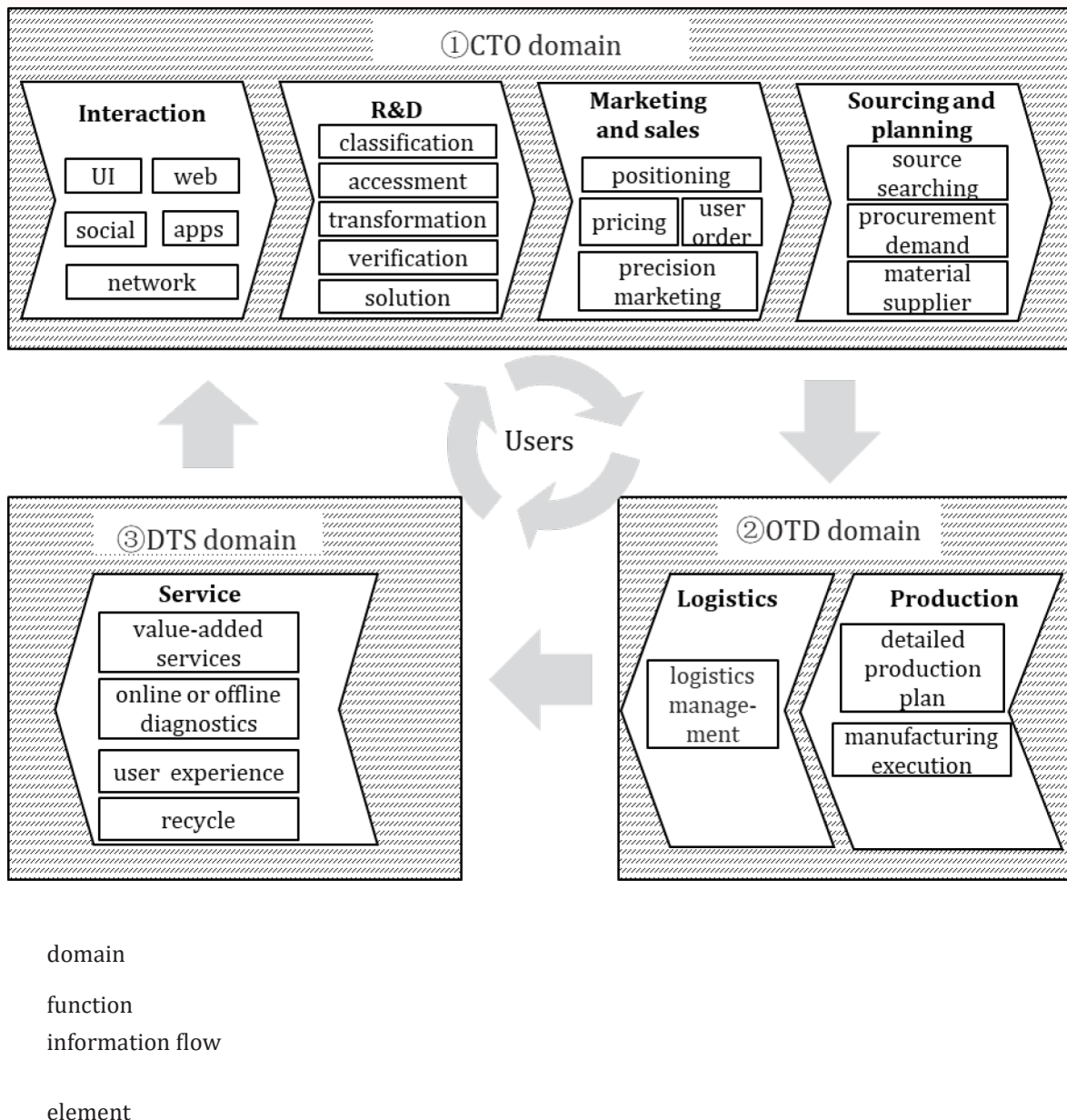


Figure 3 — Mass customization domains and functions

7 Functional model

7.1 Functional model notation

The notations used in the mass customization functional model shown in [Figure 4](#) and the interaction workflow of seven activities, i.e., interaction, R&D, marketing and sales, sourcing and planning, production, logistics and service, shown in [Figure 5](#) are described in [Table 1](#).