

# D5.1

## Workshop methodology and common information package

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Main editors and contributors: S2i, EFFRA, VTT

VERSION MANAGEMENT			
		Name	Beneficiary
<b>Author(s):</b>		Fredy Rios, Meike Reimann	S2i
<b>Contributor(s):</b>		Discussed with the consortium in conference calls	All
<b>Reviewed by:</b>		Chris DeCubber	EFFRA
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1.	28/04/20	1 <sup>st</sup> draft	Fredy Rios
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## Abbreviations and acronyms

TERMS, ABBREVIATIONS AND ACRONYMS	
<b>WPL</b>	Work Package Leader
<b>CF2</b>	ConnectedFactories 2
<b>Covid19</b>	Corona Virus Disease 2019
<b>DoA</b>	Description of Action
<b>EC</b>	European Commission
<b>SME</b>	Small and Medium Sized Enterprise
<b>WP</b>	Work package



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## Executive Summary

The following document presents the methodology and common supporting material for the execution of workshops in the context of the outreach and dissemination of the CSA ConnectedFactories 2. The objective of this document is to provide guidelines for the preparation, execution and follow-up of national/regional and European workshops organized by the ConnectedFactories 2 consortium. These guidelines will constitute a common framework that will enable a consistent conduction of the workshops by the different partners of ConnectedFactories 2 and, thus, facilitating the collection, analysis and comparison of outputs as well as the development of comprehensive results. These results will translate into recommendation to the corresponding European bodies and the overall European community.

The overall objective of the European national and regional workshops is two folded. On the input side, it aims to garner feedback from the internal ConnectedFactories 2 network and its various stakeholders. On the output side, it aims to disseminate and discuss the findings and outcomes of ConnectedFactories 2 and its sister projects to the European manufacturing community. This will involve the active engagement with actors from the manufacturing landscape to discuss and enhance the 'pathways to digitalisation of manufacturing', the 'cross-cutting factors', successful use-cases, and trends and challenges in the digitalization of manufacturing. In addition, workshops will stimulate cross-fertilisation between industrial platform communities and knowledge transfer between academia and industry. From a broader perspective, workshops will serve as platforms to:

- foster open and mutual sharing of knowledge and experiences
- identify industrial needs and requirements, trends, existing practices and obstacles,
- present the most relevant developments and outcomes of related EU projects, to facilitate and foster the uptake of results,
- evaluate the implementation of current solutions and present further use cases,
- involve developers, suppliers and users of digital technologies and digital platforms for manufacturing in the ConnectedFactories 2 workflow.

The present methodology can be considered flexible one and constitutive of a toolbox to best serve different WPs of ConnectedFactories 2. Different workshops may have the same framework but might have a different focus. Hence, these guidelines should be adapted the corresponding Workshop Leaders. This document builds on the experiences from ConnectedFactories in the planning and execution of workshops, and further refines and develops recommendations for the workshop methodology and information package in ConnectedFactories 2.



## 1 Introduction and Context

The increasingly important role of digital manufacturing platforms in the European industrial landscape, its competitiveness and evolution of the European industry, demand for advances that will enable the integration of different technologies, facilitate access to services, and allow complementary applications. New concepts should be addressed and exploited in the most productive manner, increasing the competitiveness of manufacturing companies, especially SMEs and mid-caps, in an evolving supply chains and value networks scenario. In this scenario, the articulation of European initiatives that address these challenges is essential.

This way, the ConnectedFactories 2 CSA supports the cross-fertilisation between Industrial Platform communities, facilitating the adoption and transfer of current research in digital technologies into real-world use cases, while also supporting the bi-directional transfer of skills between industry and academia. Specifically, the ConnectedFactories 2 CSA focuses on the following targets and activities:

- 1) Supporting a common and structured understanding of key enablers and cross-cutting factors with regard to the deployment of digital technologies,
- 2) Identifying pathways to the industrial take-up of digital technologies and digital platforms by taking into account legacy systems, industrial requirements and challenges,
- 3) Situating inspiring research and industrial state-of-the-art cases on these pathways and show how key enablers and cross-cutting factors are addressed along these pathways,
- 4) Stimulating the matching of skills transfer offering with skills demand across Europe,
- 5) Engaging with the research and industrial actors in both European and local fora: manufacturing companies, suppliers, etc., and herewith make sure that requirements and boundary conditions are reflected in the pathways to digitalisation of manufacturing, the use cases, the key enablers and cross-cutting factors,
- 6) Generating a broad awareness about the key enablers and cross-cutting factors, pathways and inspiring cases.

The objectives of the ConnectedFactories 2 CSA and the associated activities build on the results and methodology of its predecessor, i.e. ConnectedFactories CSA.

This document is focused on providing general guidelines and recommendations for the execution of European national and regional workshops. The remaining of this document is organized as follows: Section 2 provides general guidelines for the preparation, execution and follow-up of the workshops, including the objective, scope and target audience. Section 3 provides supporting material for the execution for the execution of the workshops, including invitations to participants, agendas, information packages, etc. Section 4 presents conclusions and final remarks to this document.



## 2 Guidelines on Methodology

This section aims at providing general guidelines for the preparation, execution and follow-up to the workshops organized by the different consortium partners of ConnectedFactories 2. These guidelines will aid in achieving a consistent and high-quality conduction of the workshops, thus facilitating the analysis of the information produced, its comparison and the development of comprehensive outcomes.

The methodology of the workshops will be based on a participative approach that will be infrastructurally supported by an information package (Section 3) adapted to each workshop. Organizers will systematically foster discussion through different debating and interaction tools and techniques.

The workshops results will be systematically captured in a report that will have a basic set of necessary fields. This will facilitate the comparison of results and the following analyses and recommendations.

A number of workshops might be executed in an online format due to the covid19 situation, rather than face-to-face. This situation is addressed in this methodology and a number of tools are proposed to overcome and capitalize on this new scenario.

### 2.1 Objectives and scope of workshops

The European, national and regional workshops aim to: (1) Obtain input and feedback from the ConnectedFactories 2 network, its various stakeholders and initiatives, and attract newcomers to the network, (2) Disseminate and discuss the findings, developments and results of the ConnectedFactories 2 and its sister projects to the European manufacturing community. To achieve these objectives ConnectedFactories 2 will engage with actors from the manufacturing landscape fostering discussion 'pathways to digitalisation of manufacturing', the 'cross-cutting factors', successful use-cases, and trends and challenges in the digitalization of manufacturing. The European, national and regional workshops will also aim to stimulate cross-fertilisation between industrial platform communities and knowledge transfer between academia and industry. In general, workshops will:

- act as arenas for open and mutual sharing of knowledge and experiences
- identify industrial needs and requirements, trends, existing practices and obstacles,
- stimulate cross-fertilisation between industrial platform communities and knowledge transfer between academia and industry,
- present the most relevant developments and outcomes of related EU projects, to facilitate and foster the uptake of results,
- evaluate the implementation of current solutions and present further use cases,
- involve developers, suppliers and users of digital technologies and digital platforms for manufacturing in the ConnectedFactories 2 workflow.

Workshops will be structured with special focus on participation and interaction, such that individual participants may:

- elaborate on the needs, challenges, barriers and matching of digital platform supply and demand,
- discuss developments and use-cases from related projects and industry, such that these cases are aligned along the ConnectedFactories and ConnectedFactories 2 pathways,



- comprehensively showcase new solution and find gaps to be filled in the 'Pathways to digitalisation of manufacturing',
- discuss 'cross-cutting factors' such as standardisation, skills transfer, and business models.

To build a common basis for all participants, the information package will describe the structure and aims of the workshops and provide templates and workshop material.

## 2.2 Target group

The groups of interest include manufacturing companies, system integrators and machine builders from different productive sectors and digitalization levels according to the ConnectedFactories 2 digitalization pathways. It is desired to involve participants both from the demand, i.e. end-user group, as well as the supply side, i.e. producers and deployers of solutions, such that a suitable match and gaps in the pathways can be found. In consideration of the local restrictions of the organizer, the following groups should be considered:

- SMEs, at different levels of the digitalization pathways
- Digital platforms suppliers and developers of digital solutions
- Strategic stakeholders and public institutions, e.g. chambers of commerce
- Organizations acting as competence centres in FoF projects
- DIHs that can complement or provide a broader perspective on the manufacturing digitalization challenges

## 2.3 Workshop execution

### 2.3.1 Preparation

The preparation of the workshops will consider in its first stage the definition of a clear objective, which can translate into concrete outcomes. In other words, what wants to be achieved and what is the output or results is expected. This will facilitate the selection of participants, engagement the production of usable results.

The structure and development of the workshops should be focused on the objectives, expected outcomes. Moreover, it must be considered whether the workshop is online or face-to-face. Various tools to support the execution of an online workshop are specified in Section 3.3.

In consideration of the objectives and local environment, suitable participants must be identified, selected and invited. A formal invitation (Section 3.1) will be sent to potential participants. To increase engagement, it is advised to deliver key elements of the 'Information package' (Section 3) to confirmed participants, specifically, agenda, presentation of ConnectedFactories 2, description of the pathways to digitalization, cross-cutting factors identified by the project, and structuring and main tools to be utilized in the workshop. It is important to highlight that, besides the workshop organization team, the remaining partners in ConnectedFactories 2 should be invited and, when possible, they should actively participate in the workshops. To further engage, additional information can be gathered by performing pre-workshop surveys (Section 3.3) on the participants to obtain a preliminary perspective on the topics to be discussed.



### 2.3.2 Development

The typical duration of workshops is six hours including the following activities.

- Presentation of ConnectedFactories 2 CSA and objectives of the workshop
- Display of CF 2 videos: The main results of ConnectedFactories should be presented and linked to the objectives of the workshop and expected outcome
- Presentation of Keynote Speakers (max. 20 minutes per speaker + 10 mins. question round): The emphasis will be in how the speaker has been able to fill a gap in the digitalization pathway of his/her organization. Speakers from SMEs/mid-caps and large companies could be invited to specify what are their next steps in their pathway. Moreover, speakers could also highlight existing gaps in their organizations, such that solutions/advice during the workshop can be discussed. This session should also include a keynote speaker from ConnectedFactories 2 or its predecessor ConnectedFactories.
- Interactive session: A participative approach will aim foster discussion on ConnectedFactories 2 results and outcomes, collect feedback and input, and refine and find gaps in one of the following topics: (1) End user needs, trends and challenges, (2) cross-cutting factors, e.g. standardisation, business models, skills, cybersecurity, etc., (3) individual pathways to digitalization of manufacturing including sustainable value networks and circular economy, and data spaces, and (4) successful use-cases of digitalization. Depending on time and infrastructural availability more issues might be addressed.
- Wrap-up: Presentation and discussion of the preliminary results as well as the follow-up and engagement strategy.

The bulk of the workshop should be centred in the interactive sessions. To foster participation during these sessions, different tools and techniques may be used, e.g. dot voting, business model/problem canvas, Thinking Hats, questionnaires, rotating teams, etc. The utilization of different techniques and tools changes whether workshops are performed face-to-face or online. Nevertheless, different tools can be utilized to reduce the geographical gap and with proper use, great results may be achieved. Various tools to support online workshops are presented in Section 3.3.



Figure 1. Sticky notes and brainstorming during interactive workshop session



Figure 2. Lego challenge during interactive workshop session.

In both cases, face-to-face and online sessions, it is mandatory that keynote speakers provide their presentation in advance such that their duration may be confirmed by the organizers, since delays in the execution of the interactive sessions are a major disturbance to the engagement of participants.

A summarized version of the minimum required activities to be performed in each workshop is presented in Table 1.

<b>ConnectedFactories 2 CSA</b>	Presentation of the <b>ConnectedFactories 2</b> CSA, its overall objectives and timeline
<b>Display of CF 2 videos</b>	Exhibition of the media material developed in ConnectedFactories
<b>Workshop objectives</b>	Description of the workshop objectives and their contribution to ConnectedFactories 2
<b>Keynote Speakers</b>	Presentations of keynote speakers from representative areas of interest to ConnectedFactories 2, e.g. SMEs/mid-caps/large companies from the supply and demand side of manufacturing
<b>Interactive session</b>	Discussion round between participants
<b>Wrap-up</b>	Presentation of preliminary results and follow-up strategy

Table 1. Minimum required activities in regional/national workshops

### 2.3.3 Follow-up

Workshops will be monitored, and results will be compiled into a workshop report. For this, a common template will be generated. Its main points and minimum content are specified in Section 3.4. Each report will consider a comprehensive analysis of the results obtained, including the main points of discussion and observation of the participants, especially regarding the identification of gaps in the existing pathways and even new possible pathways.

Workshop reports will be compiled into a single document per iteration. In this regard, the common template and workshop format will be fundamental to enable a valid comparison between workshops, which can translate into representative results and recommendations. These single documents will be of public nature and available as deliverables of the project (D5.2-5).

### 3 Information Package

#### 3.1 Invitation to potential participants

Figure 1 presents an invitation letter to workshop participants from a previous workshop. This invitation constitutes only a reference in terms of content and style. In addition to the actual invitation letter, it can be observed that the invitation package includes the agenda to the workshop. A personalized invitation letter may also be produced to formally invite keynote speakers.

**DIGITAL MANUFACTURING WORKSHOP**

We are pleased to invite you to the Regional Digital Manufacturing Workshop on the 4<sup>th</sup> May 2017 in Stuttgart. The workshop discusses technology **platform concepts and success stories** in relation to **industrial demand and customer needs**. It is going to gather experts from industry, academia and policy-making. The workshop will build on knowledge and experience of experts in digital platforms both horizontal (cross-sectorial) and vertical (domain-oriented) and industrial players of data-intensive sectors.

The **objective** of the workshop is to stimulate:

- Discussions on digital **platform concepts**, sharing **best practices** and identifying **success factors to master digitisation in SMEs from Baden-Wuerttemberg**
- **Identifying end-user needs and demands**: challenges in the deployment of digital platforms as well as current gaps and barriers
- **Aligning supply and demand**: are current solutions fulfilling real needs of customers?
- **Constituency building**: become part of one of the flagship communities that will define the future of digital manufacturing!

The **agenda** includes short presentations, demonstrations and interactive sessions.

**Context**

The future of European Manufacturing is digital. To support this, pan-European platform-building is needed, either via technology platforms or social platforms (hubs). Platforms need to be interoperable, modular, and scalable with open and standardised interfaces. A critical factor for their uptake is the affordability, both of the applications development and operation, with clear and easily understandable business cases. Digital manufacturing platforms are enabling the provision of services that support manufacturing in a broad sense. The services that are enabled by digital manufacturing platforms are associated with collecting, storing, processing and delivering data. These data either describe the manufactured products or relate to the manufacturing processes and assets that make manufacturing possible (material, machine, enterprises, value networks and – not to forget – factory workers). Regional digital manufacturing innovation hubs are ‘one-stop-shops’ for any business to access support for understanding digital technologies and for finding ways to finance/nurture the necessary investments. Various EU-funded projects will enhance the awareness among companies of these services being available and the use of digital technologies in the manufacturing sector on a regional basis. The projects/services also equip the companies with knowledge to make informed decisions regarding technology and business model options. In summary, the above mentioned projects/services will reinforce the European manufacturing industries’ position in the international scene.

**When?** 4th May 2017 (all-day event: 9 - 17)

**Where?** Stuttgart

**How do I participate?** Please answer to this Email

The event is organised by the Horizon2020 funded projects **ConnectedFactories**, **Platforms4CPS** and **BEinCPPS** on behalf of the European Commission and is free of charge.

PRELIMINARY AGENDA	
9:00	Registration
9:15	Welcome and Introduction
9:30	Presentation and Creative Session <ul style="list-style-type: none"> <li>- Setting the scene, needs and challenges to deploy digital platforms – <b>ConnectedFactories</b> Project</li> <li>- What’s in the CPS suitcase? - <b>Platforms4CPS</b> Project</li> </ul>
10:15	<b>PlatformsArena</b> (Platforms4CPS) <ul style="list-style-type: none"> <li>- Guided tour through FESTO ‘Technology Plant <b>Scharnhausen</b>’</li> <li>- Introduction of CPS platform survey</li> </ul>
12:00	Session on Cyber Physical Production Systems (CPPS) <ul style="list-style-type: none"> <li>- presentation of a Business Experiment in CPPS</li> <li>- Regional Digital Innovation Hubs and services to help SMEs to master digital manufacturing in Baden - Württemberg – <b>BEinCPPS</b> Project</li> <li>- Feedback for Regional Digital Innovation Hub</li> </ul>
13:00	Lunch
14:00	Interactive Session I <ul style="list-style-type: none"> <li>- Scenario Prototyping “CPS and CPS Platforms”</li> </ul> Interactive Session II <ul style="list-style-type: none"> <li>- User needs, demands and requirements</li> <li>- Gaps &amp; barriers for deploying digital platforms</li> <li>- Impact of digitisation/digital platforms on manufacturing</li> <li>- Successes and challenges as experienced in digitising manufacturing</li> </ul>
16:45	Final Discussion & Conclusion
17:00	Closing of Workshop

Figure 3. Invitation package from ConnectedFactories challenges workshop.

#### 3.2 Agenda

An example of a workshop agenda is presented in Table 2 (Recommendations are written in grey). The content may be adapted and tailored to the specific focus and requirements of the workshop by the.

ConnectedFactories 2 – National/Regional Workshop	
09:00	<b>Registration</b>
09:30	<b>Welcome and introduction</b> <ul style="list-style-type: none"> <li>- Presentation of the workshop objectives</li> <li>- Standard Presentation of ConnectedFactories 2 (possibly showcasing media material)</li> </ul>
10:00	<b>Keynote Speakers Sessions (Specific according to the focus of each workshop)</b> <ul style="list-style-type: none"> <li>- CF1 or CF2 keynote speaker</li> <li>- Successes, challenges and opportunities in digitalization</li> <li>- Results from Project/Program: Pathways, use-cases, cross-cutting factors</li> <li>- SME/Industry perspectives</li> <li>- Q&amp;A</li> </ul>
11:20	<b>Introduction of afternoon sessions: Workshop methodology and execution</b>
11:30	<b>First round of interactive sessions (Specific according to the focus of each workshop)</b> <ul style="list-style-type: none"> <li>- End-user needs, trends, challenges</li> <li>- Cross cutting factors (standardisation, business models, skills, cybersecurity, ...)</li> <li>- Individual pathways to digitalization of manufacturing</li> <li>- Successful use-cases</li> </ul>
12:30	<b>Lunch</b>
13:30	<b>Second round of interactive sessions (continued).</b>
14:30	<b>Coffee break</b>
15:00	<b>Plenary session: Preliminary results, conclusions and feedback</b>
15:30	<b>Closing of the workshop</b>

Table 2. Example of agenda for a face-to-face ConnectedFactories 2 national/regional workshops.

Early workshops may also be carried in an online format (due to the covid19 situation) through the support of different tools and techniques.

### 3.3 Supporting documents

The ConnectedFactories 2 coordinating team will provide the organizers with a reference presentation of ConnectedFactories 2. This presentation will be standard for every workshop and it will specify the purpose, key elements, history, previous results of the CSA, among others.

To foster engagement and fruitful outcomes, preparatory material will be sent to workshop participants beforehand once participation has been confirmed. In particular:

- Short description of the CF2 CSA
- Introductory presentation of ConnectedFactories 2 for workshops
- Description and scope of the workshop, including structure and tools of the interactive session

In addition, the following material could be referenced (not sent) to engage with participants that want to obtain further understanding of ConnectedFactories 2 CSA:

- [ConnectedFactories 2 website](#)
- [Workshop related Deliverables](#)
- Description of the pathways to digitalization of manufacturing
- Description of the cross-cutting factors
- Reference to the multimedia material describing the pathways to digitalization of manufacturing

Additionally, questionnaires can be performed before hand, to identify priorities, the main points of interest, familiarity with the topics, and overall perspectives regarding the issues to be presented and discussed at workshops. Options to support pre-workshop activities are [SurveyMonkey®](#) and [Mentimeter](#), which also include visualization tools, e.g. word/concept clouds, to define specific areas of interest of the participants.

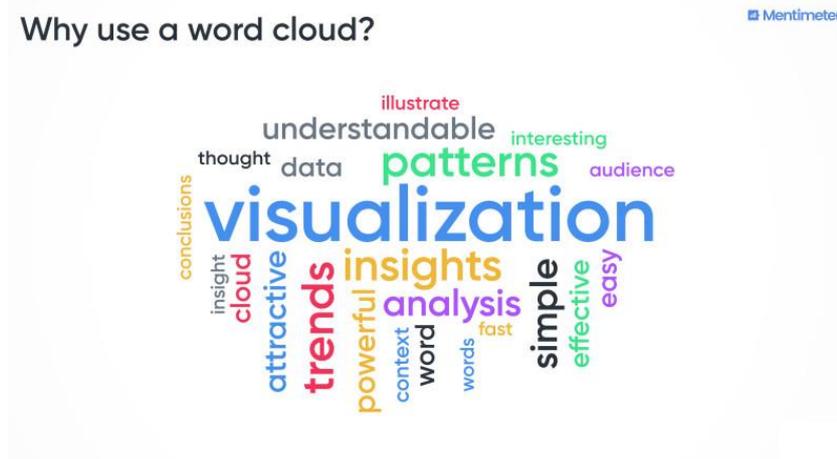


Figure 4. Word cloud produced with Mentimeter.

The success and productivity of the workshop largely depends on how interactive sessions are organized and managed. In the following, a small sample of tools, techniques and guidelines are provided to foster productive discussion and engagement among the participants. Conduction techniques include

- SMART goals: These goals are specific, measurable, achievable, relevant and time bound. These goals produce results that can easily be transformed into concrete recommendations.
- Short and concise work-sessions: To prevent exhaustion of participants, interactive sessions may be divided in shorter periods with strict timing and concrete objectives.
- Rotation: Participants are assigned random numbers and organized in small groups. Groups are given short concrete tasks to fulfil within a strict timeframe and afterwards, groups are reorganized according to the random numbers. This prevents exhaustion and maintain active participation.

Support tools include:

- Feedback and participation mechanisms: Specific feedback techniques to avoid losing time and trigger group interest and fruitful discussion can be considered, such as Thinking Hats, dotmocracy, brainstorming, white boards, design thinking, road mapping, etc.
- Online questionnaires: If questionnaires and feedback was requested a priori to the workshop, this information should be presented in a way that guides and fosters the discussion, e.g. to rebut or confirm the results

### 3.4 Workshop report

The outcome of the workshops will be captured in individual reports. These reports will jointly analysed and overall conclusions, tendencies and recommendations will be compiled into a general workshops report. Hence, it is essential that all workshops share a minimum floor in terms of format, such that the results and outcomes may me faithfully compared and analysed.

Table 4 details the minimum sections that each workshop report should contain and possible alternatives of content for each section.

Section	Required information
<b>Executive summary</b>	Brief description of the workshop, overview of objectives, results, and participants, and overall place of the workshop in the context of the ConnectedFactories 2 CSA
<b>Introduction</b>	<ul style="list-style-type: none"> <li>- Detailed description of the why, where, and when of the workshop, including a detailed description of the objectives and expected results</li> <li>- Description of participants and keynote speakers</li> <li>- Detailed description of the methodology</li> </ul>
<b>Key messages from presentations</b>	Description of the main `take away` messages of each of the presentations, including the main points of discussion and contingency during the corresponding session
<b>Key outcomes from interactive sessions / discussions</b>	Depending on the infrastructural and time capacity, workshops will typically provide results in at least 2 of the following areas: <ul style="list-style-type: none"> <li>- End-user needs, trends and drivers, enablers and barriers, market needs, requirements and challenges regarding the deployment of digital platforms</li> <li>- Pathways to digitalization. e.g on `Pathway Circular Economy`</li> <li>- Lessons learnt from successful use-cases/best practices</li> <li>- Cross-cutting factors, including standardisation, security, business models, ownership, liability, social aspects, skills, Sustainability issues</li> </ul>
<b>Conclusion</b>	Overview of the results and engagement strategy after the workshop

Table 3. Required content of each workshop report

Although the outcomes and final reports will be public, the detailed information of discussions and personal contributions will be anonymised.

## 4 Conclusions

This document presents the methodology for the preparation, execution and follow-up of European, national and regional workshops in the context of the ConnectedFactories 2 CSA and an information package to support the preparation of such workshops. These guidelines should be considered flexible and adaptable to best serve different WPs of ConnectedFactories 2. Different workshops may have the same framework but might have a different focus. Hence, these guidelines should be adapted the corresponding workshop organizers.

