

Context Shapes Experience: Building Better Tulip Apps

Geoff Winkley, Tulip

Lili Tordai, Tulip

FEATURING



Geoff Winkley
Delivery Lead, Tulip



Lili Tordai
Library Lead, Tulip

AGENDA

01

Why User Centricity?

The Philosophy & Benefits

02

The Physical Perspective

How to plan in Solution Design

03

App Context

Thinking Through App Experience

04

Best Practices in Action

A look at Human-Centric Solutions

05

Feedback Cycles

Getting Users in the Loop

Why User Centric Solutions?

Lean MFG x Tulip Apps



The Toyota style is not to create results by working hard. It is a system that says **there is no limit to people's creativity.**

People don't go to Toyota to 'work' they go there to 'think'.

– Taiichi Ohno

Industrial Engineer, Creator of
Toyota Production System



What is "User Centric"?

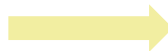


**The System
Serves the Users**

Core (Lean) Principles

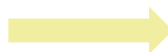
User Centric Solutions are rooted in Lean Manufacturing concepts:

- Everyone participates in continuous improvement



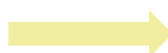
Kaizen
Small, Incremental Change

- Entering data is a non value-add activity



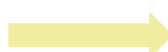
Muda
Waste in Operations

- Model the Solution around where the work happens



Gemba
The Actual Place

- Provide the right, contextualized information



Respect for People
Human Nature

Navigating from Point to Point

Which is serving the User?

A



B

MapQuest: Driving Directions: North America Page 1 of 3

MAPQUEST

[Send To Printer](#) [Back To Directions](#)

Start: Dallas, TX
US

End: 312 Barton Springs Rd
Austin, TX
78704-1213 US

Distance: 196.99 miles

Total Estimated Time: 3 hours, 21 minutes

Need Ink?
Buy printer cartridges:
Save up to 75%
Free UPS 2-day shipping
[Buy Now!](#)
www.inksell.com

Directions	Distance
1. Start out going South on N AKARD ST toward FEDERAL ST.	0.1 miles
2. Turn RIGHT onto ELM ST.	0.5 miles
3. Turn SLIGHT LEFT to stay on ELM ST.	0.1 miles
4. ELM ST becomes COMMERCE ST.	<0.1 miles
5. Merge onto I-35E S.	57.4 miles
6. Merge onto I-35 S/US-81 S via the exit- on the left.	137.6 miles
7. Take the exit- exit number 234A- toward 1ST ST/HOLLY ST.	<0.1 miles
8. Turn SLIGHT LEFT onto I-35 N.	<0.1 miles
9. Turn RIGHT onto CESAR CHAVEZ ST E/E 1ST ST/TX-343 LOOP.	0.4 miles
10. Turn RIGHT onto BRAZOS ST.	<0.1 miles
11. Turn LEFT onto E 2ND ST.	<0.1 miles
12. Turn LEFT onto CONGRESS AVE S.	0.3 miles
13. Turn RIGHT onto BARTON SPRINGS RD.	0.1 miles

End at 312 Barton Springs Rd, Austin, TX 78704-1213 US

<http://www.mapquest.com/directions/main.adp?do=prt&n=TRAVIS%20COUNTY&lq=39Vz74hg7M...> 04/15/2004

User Centric Solutions = Productivity Gains = ROI

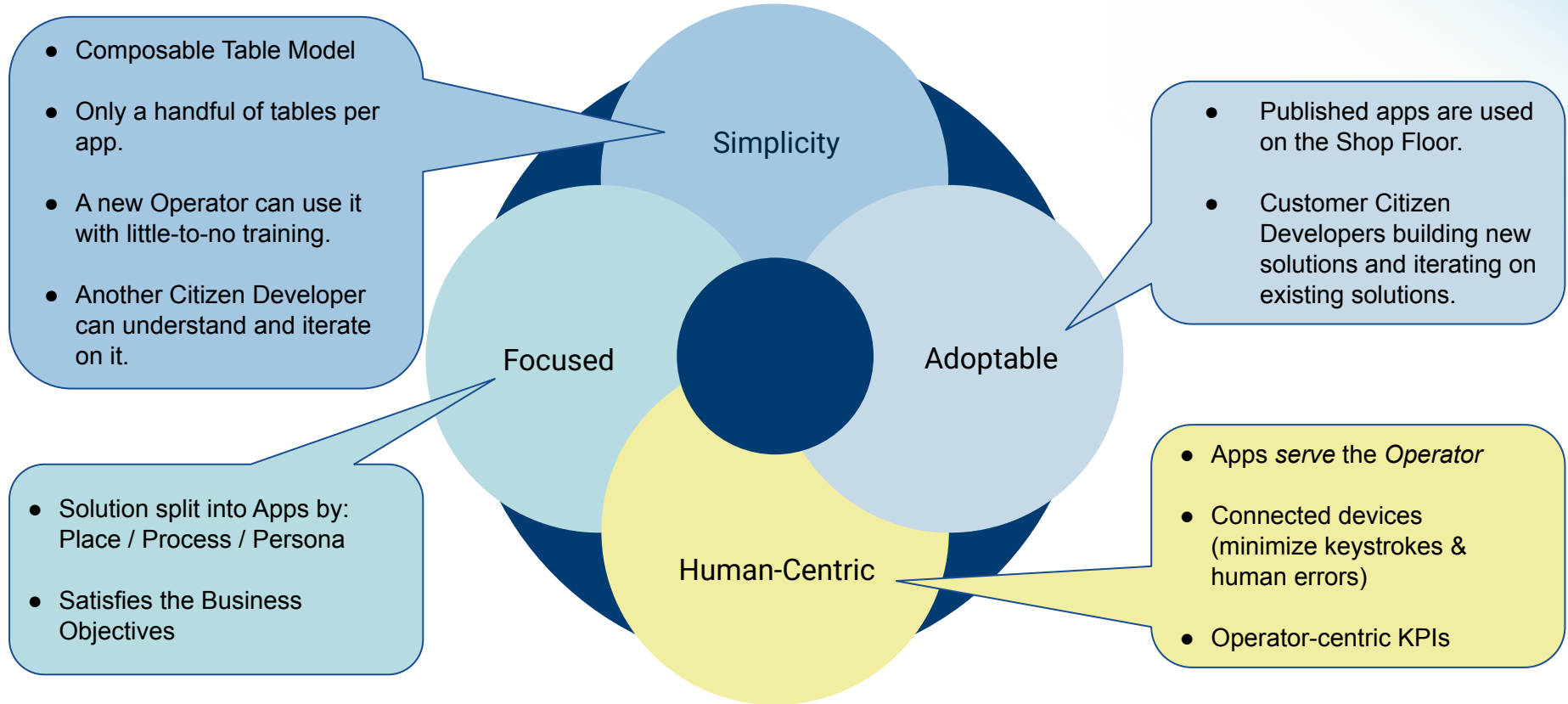
User Centric Solutions play a part in:

- Reduction in Downtime
- Improvement in Quality
- Increased Throughput

Through providing Users:

- Clear work instructions and digital guidance
- Communicating the right information at the right time
- Eliminating pen and paper as the only way to record information

Evaluating Tulip Apps - Solution Design Credo



Basic UI principles

Standard colors

Consistent layout

Step trigger naming conventions

Intuitive navigation

Standard icon usage on buttons

Consistent header and footer design

 **General Overview** Menu

Purpose

This UI template assists application builders in creating a user-friendly, consistent, and streamlined application. It provides less experienced application developers with a usable template to start working with, while also aiding more experienced developers in faster development and maintaining a consistent interface

Considerations

The main principles behind creating this template were: simplicity, easy customization, appropriate contrasts for application in industrial areas, clear and consistent labels, and function-oriented design

Content

- Colors
- Buttons for light and dark backgrounds
- Button icons
- Typography
- Headers and footers
- Base Layout for light and dark modes
- Step templates for multiple step types and dashboards

Next →

Check out: Templates and guidelines in the **library.tulip.co**

The Physical Perspective in Solution Design

A Starting Point



Where and How to Start

1

See the Process

Go beyond the documents and spreadsheets and view operations first hand

2

Understand the Environment

Will the users be wearing gloves and a suit? Will users be sitting at a desk or operating a machine?

3

Plan for Devices

Laptop, Tablet, and mobile devices are all options to run Tulip, and the device should be fit for purpose

1

See the Process

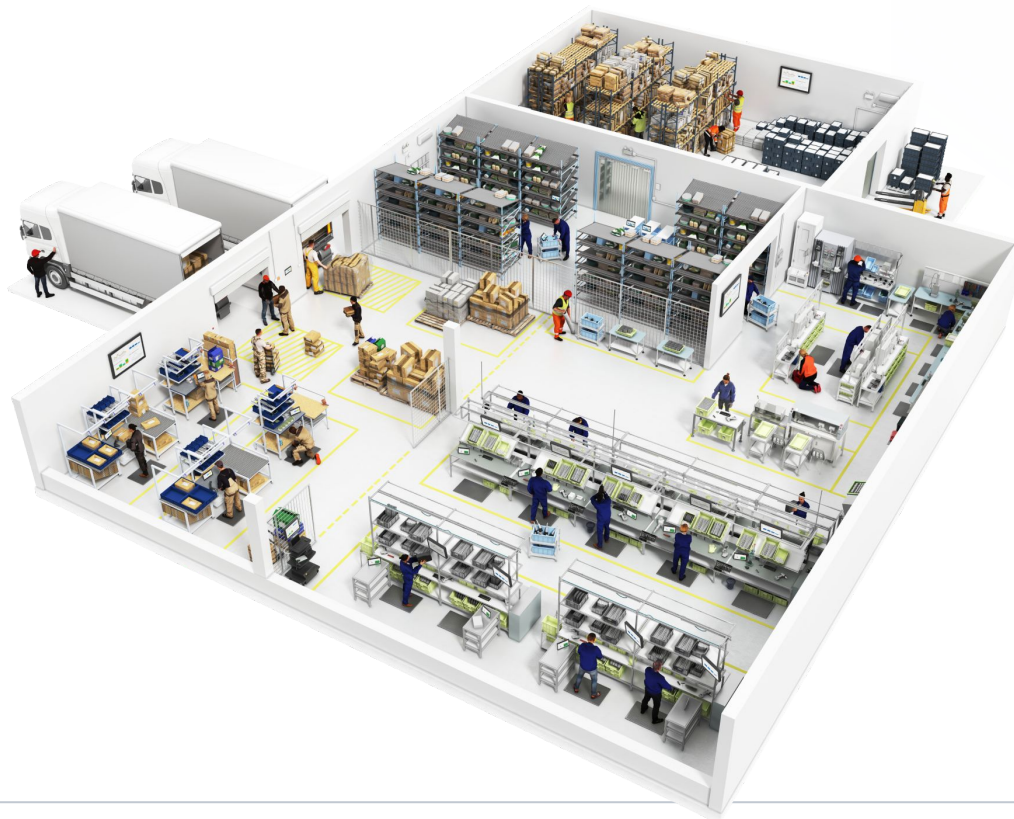
Gemba Walk Checklist

- ☒ What are you currently working on?
- ☒ Is there an established process for this type of work?
- ☒ Do you have any problems with the established process?
- ☒ Why is there a problem?
- ☒ How can you fix the problem?
- ☒ What do you do to recognize the root cause of the problem?
- ☒ Who do you speak with if there is a certain problem?

Aka: "Genchi gembutsu." =
"Go and see for yourself."

2

Understand the Environment



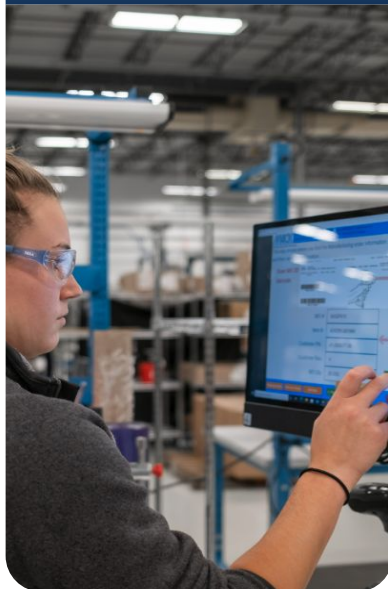
2

Understand the Environment



Plan for Devices

Computers



Mobile Phones & Tablets



Machines



Wearable Devices



The Physical Perspective in Composability



Context Matters

Empowering Humans to be Successful



STANDARD AND MEANINGFUL COLORS

WHICH DESIGN IS BETTER?

A

 **Select defect** Menu

Select defect event

Material ID

Defect reason

Select an option

Status

Select an option

From

To

ID	Mat...	Reported date	Reason	Status
sKbiT5...			Set in Or...	REVIEW
JQcd6...			Standard...	REVIEW
QE-1		2024-04-30 09...	Defect 1	CLOSED
QE-2		2024-04-30 10...	Defect 2	CLOSED
QE-3		2024-04-30 11...	Defect 2	CLOSED
test				
QE-4		2024-05-31 17...	Defect 1	CLOSED
QE-5		2024-05-31 17...	Defect 1	CLOSED

OR


Barcode Scanner

Previous

Report defect

Add note

Return to home

Submit

View CAD

B

 **Select defect** Menu

Select defect event

Material ID

Defect reason

Select an option

Status

Select an option

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ID	Mat...	Reported date	Reason	Status
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OR


Barcode Scanner

Previous

Report defect

Add note

Return to home

View CAD

Submit

OPERATOR WEARING GLOVES

WHICH STEP DESIGN IS BETTER?

A

 **Select reason** Menu

Select a downtime reason

Equipment Failure

Planned Maintenance

Setup & Adjustments

Operator or Material Issues

B

 **Select reason** Menu

Select a downtime reason


Equipment Failure


Setup & Adjustments


Planned Maintenance


Operator or Material Issues

HAVE AN INTEGRATED SCALE, BUT THE USER NEEDS TO TAKE ACTIONS WHICH STEP DESIGN IS BETTER?

A

 **Measure weight** Menu

Information	Work order ID SN-3211-3023	Status IN PROGRESS	Material Definition ID CYL-001
--------------------	-------------------------------	-----------------------	-----------------------------------

Instructions
Weigh the pneumatic cylinder


Actions required
Lower limit: 20.8 g Upper limit: 24.6 g
Weight (g)

20.2

Wrong measurement

Confirm →

B

 **Measure weight** Menu

Information	Work order ID SN-3211-3023	Status IN PROGRESS	Material Definition ID CYL-001
--------------------	-------------------------------	-----------------------	-----------------------------------

Instructions
Weigh the pneumatic cylinder


Actions required
Lower limit: 20.8 g Upper limit: 24.6 g
Weight (g)

20.2

Measurement is out of tolerance, you must create a NCR

Create an NCR

Building the Right Interface

Encourages Use: Makes life easier for the User

TULIP Manual value input Menu Quality inspection (assembled product)
Geoff Winkley (Tulip)

Inspection Results

Enter the measured value of the casing diameter displayed on your measuring device

Lower limit: 24.5
Upper limit: 25.5

Measured value *

✓ Save

Please test all the products before proceeding

1 out of 2 product tested

Selected work order

ID: WO1020932 Material Definition ID: D25-100-E

Measured	Passed	Unit ID
24.2	No	LOT149207

Next →

Represents Process: Familiar order of steps

Built in Compliance: Logical mistake proofing

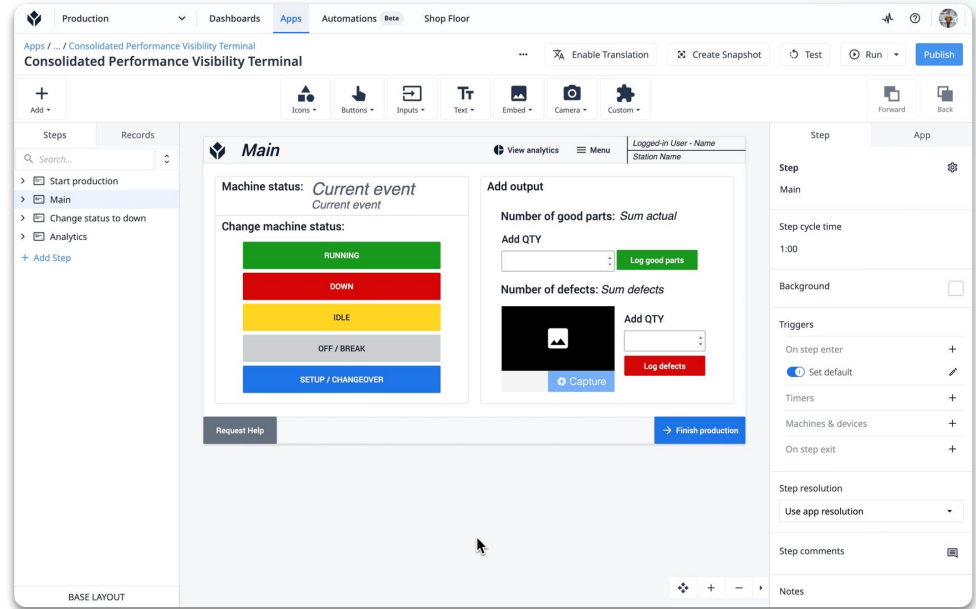
Product of Feedback: Input Captured during Development

Great Apps Augment the Human

Fit for the User Persona

Provide the Right Information

Active Feedback



All Users Are Not The Same

What role does the User have?

- Assembly Technician, Machine Operator, Supervisor, Quality Control, ect
- Each role will have unique perspective and requirements

What level of training or experience do they tend to have?

- New employees in a high-turnover industry may need more guidance, *e.g. low complexity assembly*
- Experienced technicians may need flexibility, *e.g. lab operations*



Provide Relevant Information, Not More

Order/Batch to
match with
physical
product

Rich media,
simple
instructions

Helpful
metadata

Cleanliness check

Development Version

Test Station 1

Blending of SolidX 60kg

Geoff Winkley (Tulip)

Batch info	ID	Process Order ID	Product Name
	BATCH_09042025025337	PO_09042025025337	Blending demo

Instructions

Check environment cleanliness



☒ Equipments of previous batch are removed *

☐ Manufacturing space is clean *

Report Comment

Help

Next →

Clear choices to
proceed

Embedded Feedback

Automate, but Notify

- An out of tolerance inspection may trigger a defect to be created, but let the user know with a message
- Use colors and text to indicate good vs. bad results

Practice Positive Error Messaging

- Consider hard validation rules vs. conditional errors
- Make error messages clear and concise so the user understands the issue

The screenshot displays a web interface titled "Environment check". At the top, there is a header bar with the TULIP logo, a menu icon, and a snapshot timestamp of "Sep/12/2024". On the right side of the header, it shows "Test Station 1" and the user "Geoff Winkley (Tulip)". Below the header, a "Batch info" section contains fields for "Batch Number" (BATCH_1725981006), "Process Order ID" (PO_1725981006), and "Product Name" (SolidX). The main area is divided into two columns. The left column, titled "Instructions", contains the text: "Enter and check humidity and temperature values" and "If you are out of range wait until stabilization". The right column contains two input fields. The first is "Humidity [%] - (Range: 40 % - 60 %) *" with a value of "52" entered. The second is "Temperature [C] - (Range: 20°C - 24°C) *" with a value of "19" entered. The temperature input field is highlighted with a red border, and a red error message is displayed below it: "Value must be inside range (inclusive): 20 - 24." At the bottom of the interface, there is a "Report Comment" button with a warning icon and a "Next" button with a right arrow icon.

Best Practices in Action

Let's look at some scenarios



Demo Setup!

- Located in the Packaging Room
- There is a shelf of boxes that need to be weighed before shipping
- Operator's role is to take a box from a shelf, weigh the box, and record the weight on the work order

Yes, this is a very simple example!



Asking questions

WHERE?

Context of interaction

WHO?

Subject of interaction

WHAT?

Object of interaction

HOW?

Constraints of interaction

WHERE? - Context of interaction

How often can the user interact with the application?

How can we limit the number of interactions and clicks?

Is the interaction in the form of touching/clicking or other (e.g. barcode scanning)?

Is the environment well lit? Is the environment noisy?

WHAT? - Devices and integrations

What devices that user actually needs?

Does it speed up the process or ensures data capture if the device is integrated?

Are there any devices already available? If yes, what kind?

Can we collect information from any machines? Which HMI to use?

*Check out: Devices and connectors in the **library.tulip.co***

WHO? - Mistake proofing & positive error messaging

How much information does the specific user need?

Does the user need to resolve the error / ask for help / be informed?

Should there be highlighted points in work instructions to avoid common mistakes?

How much experience does the user have?

HOW? - Other human needs

Which languages are spoken by the user(s)?

Does any user have any disabilities?

How does the app handle necessary breaks?

What if somebody makes a mistake?

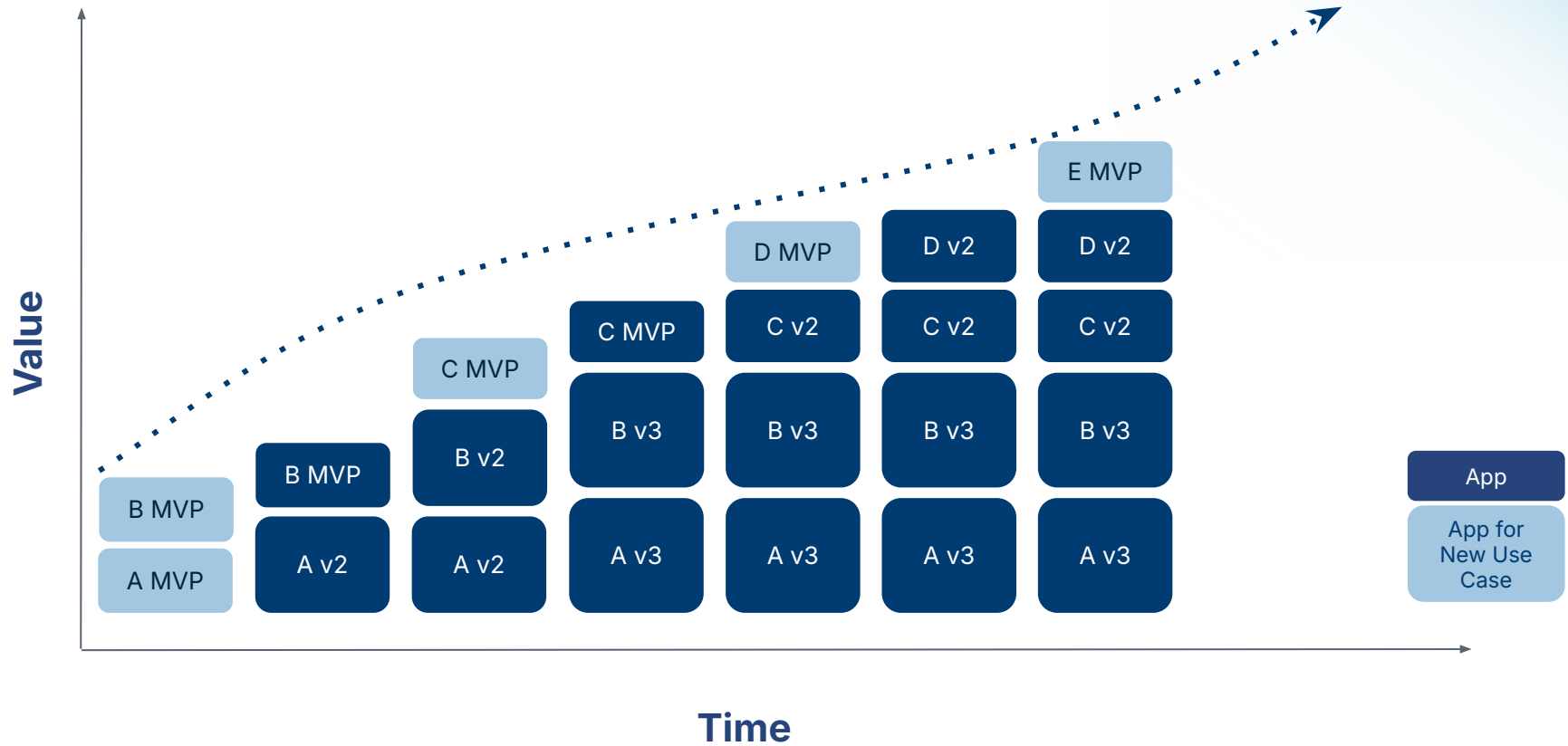
Check out: Use AI for automatic translations tulip.co/platform/frontline-copilot

User Feedback and Iteration

Let's look at some scenarios



Solutions Evolve Over Time



Listen to Users

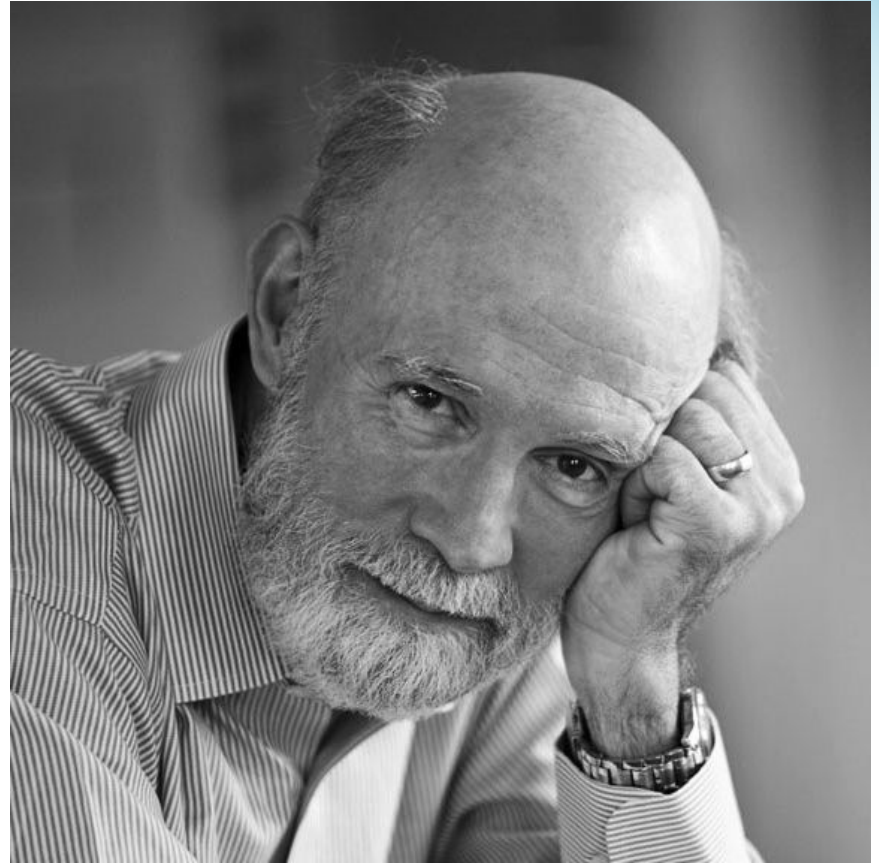
- No App is perfect in Version 1
 - It's impossible to understand all edge cases and “real world behaviors”
- Collect user feedback at all points in the development process, including post-deployment
 - Iterating fast builds end user confidence and excitement
 - This is one of Tulip's core capabilities as a cloud based platform - Lean into it



If this lean stuff seems easy, **you're probably not doing it.**

– Jim Womack

Researcher, Author, and founder of
the **Lean Enterprise Institute**



QUESTIONS?



TULIP

THANK YOU