Xerox Operability Project

Austin Henderson
UCB/Design MDes 2025
Oct 29, 2025

Overview

- 1968 Xerox imagines PARC
  - How does the copying business become digital?
- 1970 Xerox opens PARC
  - What does "The Office of the future" look like?
- 1980 The "Operability Project" emerges
- 1981 Setting up
- 1981 Observing a "naturalistic" practice of "copying"
- 1981 Heading off in many directions

Emergence (1979 – 1980)

- 1979 Austin exploring demo for "tech reps" (smalltalk)

- 1980 July Dick Jansek, Xerox service, explores PARC
  - Austin presents

- 1980 December Dick Jansek visits PARC with a challenge
  - Putting a display on a copier
  - Austin presents: prototyping - early Trillium
  - Lucy Suchman presents: Santa Clara study of Alto
  - John Seely Brown agrees to the project
    - Staff: Austin and Lucy

- 1980 December We choose an approach
  - Lucy introduces Austin to ethnomethodology
  - Decide: watching copying is better than watching prototypes in use

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Setting up (1981)

- ☐ 1981 Jan visit Rochester, meet design people, get videos
- ☐ 1981 Jan talk with sales; choose Xerox 8200 copier
- ☐ 1981 Jan - Feb observing the 8200 in the wild
  - ☐ Stanford Research Institute (aka SRI)
  - ☐ Stanford University
- ☐ 1981 Jan settle on the 8200 in a controlled environment
- ☐ 1981 Jan talk with sales; approve 8200
- ☐ 1981 Jan talk with tech reps; get agreement to support
- ☐ 1981 Feb PARC becomes an 8200 customer
  - ☐ Accounting
  - ☐ site choice (Hanover Street; in an office, not hallway)
  - ☐ site preparation (power, space, floor!)
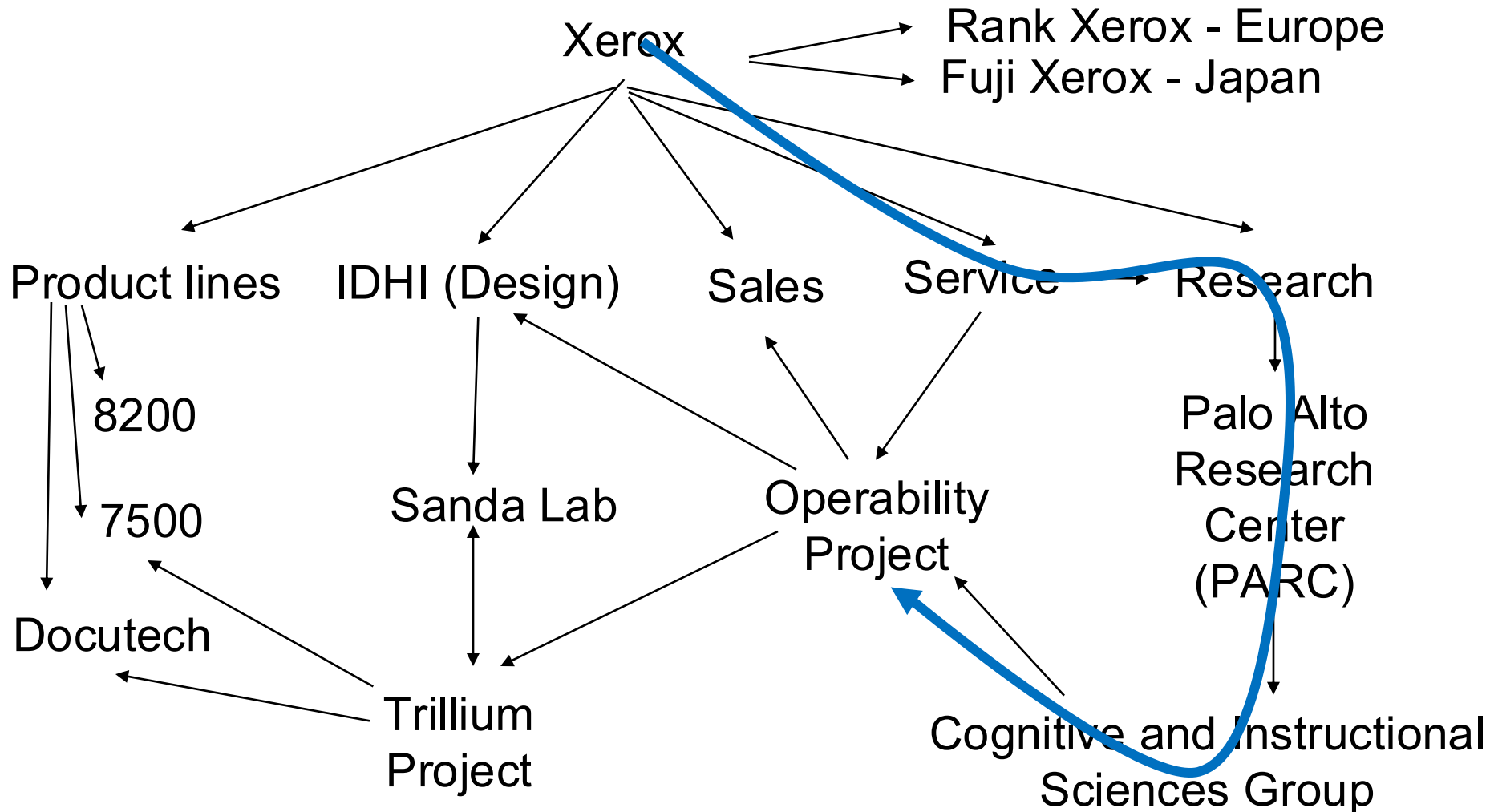- ☐ 1981 Feb observation (chairs, door, two-focus video)

Observation (1981)

- 1981 Mar - May
- "naturalistic"
- by appointment only
- bring your own job
- "think aloud" and collaborations
- capture:
    - observers in the room
    - two-focus video

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"Maybe it just knows it anyway..."

Organizations

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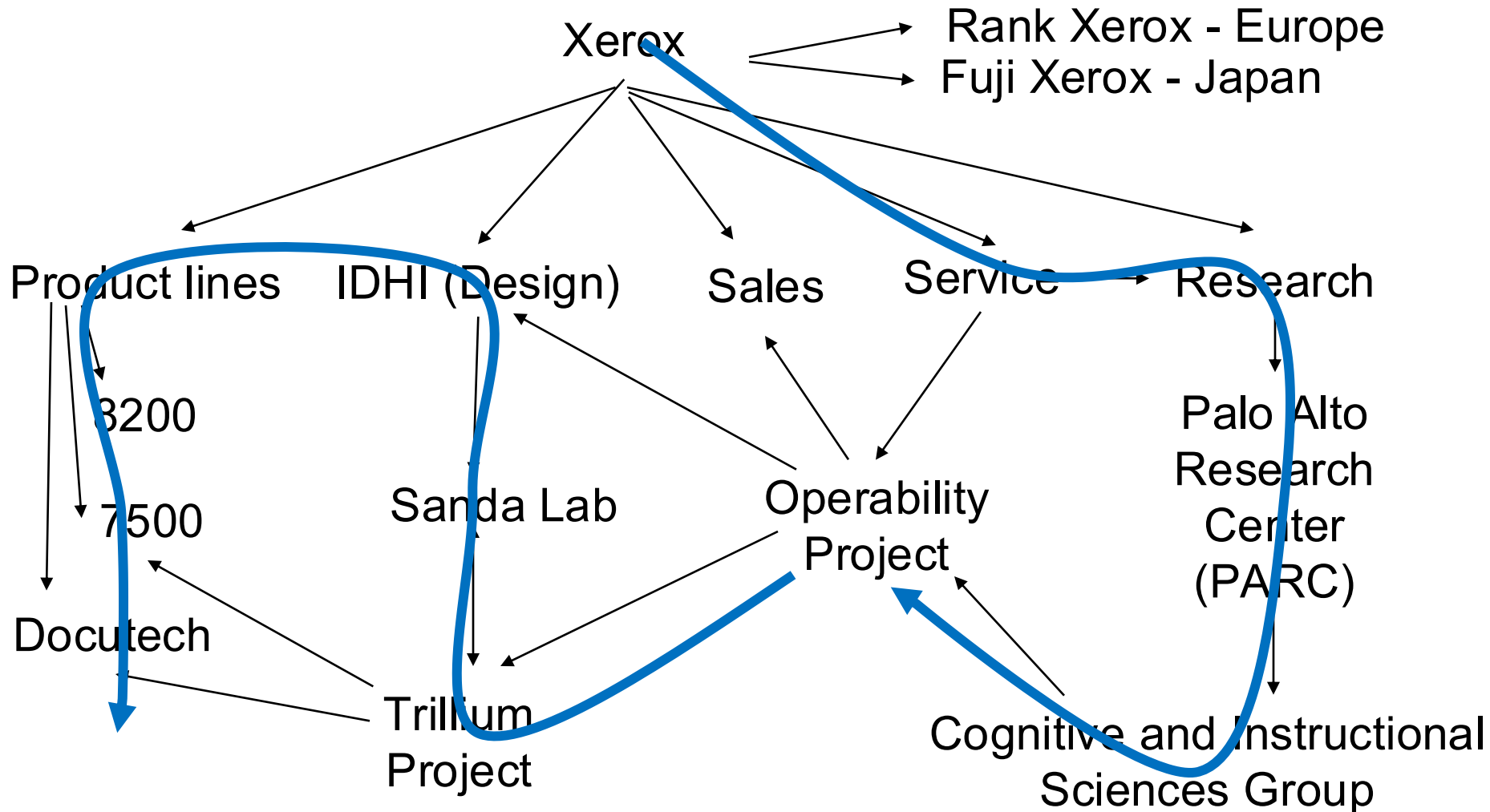
Heading off in many directions

- **1981** Design tool for designers (Austin Henderson)
  - Trillium
- **1981 - 1982** Expert coach (Richard Fikes)
  - Bluebonnet
- **1981** Theory of Human-Computer Interaction (Lucy Suchman)
  - Paper on "unaided" copying (1982)
  - "Plans and Situated Actions" (1987)
  - "Human-machine Reconfigurations" (2007)
- **1983** Copiers in the wild (Jeanette Blomberg)
  - Not so wild
- **1982 - 1986** Collaborative design (Henderson, Blomberg)
  - Trillium Community

Questions?

Xerox Trillum Project

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Organizations

Xerox → Rank Xerox - Europe

Xerox → Fuji Xerox - Japan

Xerox → Product lines

Xerox → IDHI (Design)

Xerox → Sales

Xerox → Service

Xerox → Research

Product lines → 3200

Product lines → 7500

Product lines → Docutech

IDHI (Design) → Sanda Lab

Sanda Lab → Trillium Project

Research → Palo Alto Research Center (PARC)

PARC → Cognitive and Instructional Sciences Group

Trillium Project → 7500

Operability Project → IDHI (Design)

Operability Project → Sales

Operability Project → Service

Operability Project → Trillium Project

Operability Project → Cognitive and Instructional Sciences Group

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Overview

- 1981 April Getting started
- 1981 August First Demo
- 1981 September Second Demo
- 1982 – 1990's Trillium in use
  - IDHI
  - Trillium Community
  - Docutech
- 1983 - 1985 Trillium Publications

Getting started

- 1981 Apr-May Where do UI's for Xerox products come from?
  - Visit "Industrial Design Human Interface" (IDHI)
    - Rochester (copiers) – design UI on story boards, then implement, ~ 1 year to iterate
    - El Segundo/LA (printers) – fast prototype, ~ 1 month to iterate
    - Henderson (TX2, BBN, PARC) – much master prototyping, ? 1 hour to iterate

- 1981 Jun Research: Focus on tools for designers
  - Assume knowledgable about Xerox UIs
  - Do *NOT* assume: programming skills
  - Question: Can designers create fully operable UIs quickly
  - Assume research-level development environment
  - Terms
    - "user" is confusing: users of copiers, users of design environment
    - "designer" uses design environment

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First demo (1981 August)

- 1981 Jun Exploration (evolutionary development)
  - Just hacked something over a weekend
  - Showed around to colleagues:
    - Got help with Interlisp – learning, changes, …
    - Got support from "management"
    - Got support from AV department (Mark Chow)
  - Got bad advice
    - "teach the designers to program"
    - "use sophisticated programming ideas" (OO, LOOPS, …)
- Key ideas:
  - two-level CM for copier: job definition, job presentation
  - widget-oriented development tool: types, with properties
- Filmed (!) 5 minute demo
  - Make friends with AV

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Second demo (1981 September)

- 1981 June Visit my users, with film in hand
  - Service people: Dick Jansak
    - "Not our job": visit IDHI
  - IDHI:
    - "you should see the Sanda lab" (aka 7500)
    - Sanda demo: design and implementation (Pat Wall, Kathy Matysek)
    - Problem identified: "how do you talk to each other?"
      - CONTACT!
  - Agreed to try their design on my demo (Trillium)

- 1981 September IDHI visit for 2 days
  - Analyzed their copier (butcher paper diagram, 10 ft long)

- 1981 October IDHI visit for 1 week
  - Trillium.0 failed; but with Henderson programming at night, it succeeded
  - Agreed to take next step
    - get IDHI machines;
    - further develop Trillium

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TRILLIUM:

A Knowledge-based Design Environment for Control/Display Interfaces for Designers, Not Programmers

Trillium: A Four-Level Design Environment,
for exploring new control display interfaces through workstation-based simulations
Austin Henderson, Xerox PARC, (1983)

	Who	Raw Material	Product
Level 4	Designers (non-programmers)	Items (or item types)	Interfaces
3	Advanced Designers (non-programmers)	Item types + composition description	Composite item types
2	Support Programmers	Interlisp-D	Primitive item types
1	Researchers (programmers)	Interlisp-D	Trillium Design Environment

Trillium supports the design exploration process in three ways, by providing...

1 **appropriate abstractions,** from which new interfaces can be easily created;

2 **a set of tools,** enabling the creation of new abstractions, thereby allowing the terminology of design to evolve to reflect new understanding;

3 **an embedded theory of design,** which encourages designers to separately articulate two things: the models of the machine, which they expect the operator to have, and the presentation of those models to the operator.
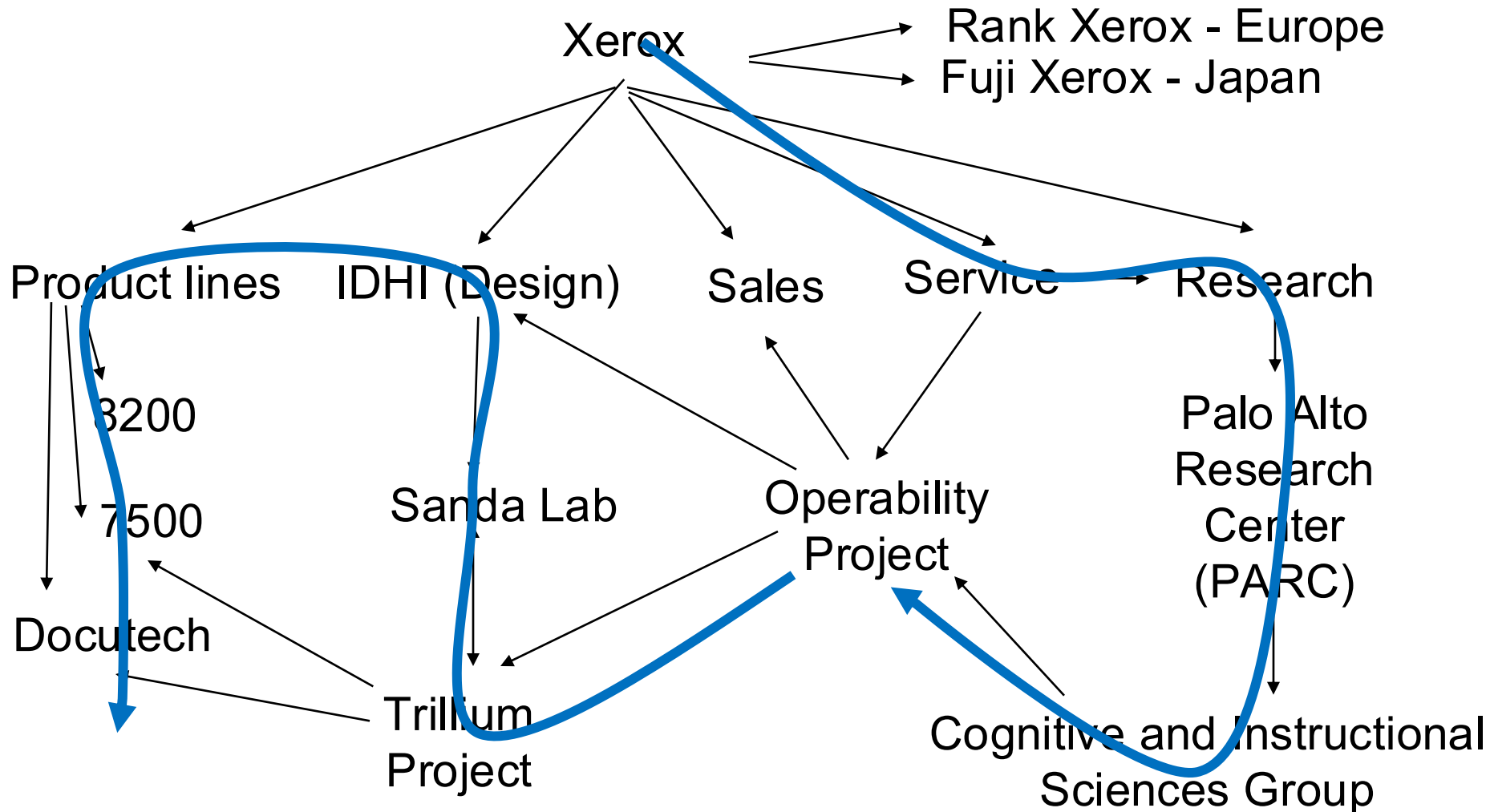
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Trillium into use (1982 - 1990's)

- 1982 – 1990's Trillium to IDHI
    - Worked for many projects
        - Rochester, El Segundo, Rank Xerox, Fuji Xerox
    - 4-level design environment
- 1982 Formed the Trillium Community
    - All the users of Trillium
    - Critical support from Jeanette Blomberg
    - Promised IDHI control of Xerox UI designs
- 1983 Trillium in Docutech
    - First digital copier
    - Required new CM (a print shop)
    - Adopted evolutionary design and development
        - Put Trillium virtual machine in the copier
        - Shipped improved CMs after shipping the machine
    - Adjusted nature of IDHI control of Xerox designs

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Trillium publications (1983-1985)

- 1983 Video at CHI'83 conference, Boston
  - 25-minute video

- 1985 Paper at CHI'85 conference, San Francisco
  - All the users of Trillium
  - Critical support from Jeanette Blomberg
  - Promised IDHI control of Xerox UIs

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Organizations

Xerox → Rank Xerox - Europe
Fuji Xerox - Japan

Xerox → Product lines, IDHI (Design), Sales, Service, Research

Product lines → 8200
Product lines → 7500
Product lines → Docutech

IDHI (Design) → Sanda Lab

Operability Project → Sales
Operability Project → Service
Operability Project → IDHI (Design)
Operability Project → Trillium Project
Palo Alto Research Center (PARC) → Operability Project

Research → Palo Alto Research Center (PARC)
Palo Alto Research Center (PARC) → Cognitive and Instructional Sciences Group
Cognitive and Instructional Sciences Group → Operability Project

Trillium Project → 7500

Questions?