

How Do Technologies Change Organizations?

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Barley's Law of Technological Change

You almost never get **only** what you expect and sometimes you don't even get that.

Corollary:

However, something usually happens.



Reasonable Generalizations

- The *second order* effects of a technology are usually more important than the *first order* effects.
- Second order effects involve changes in with whom we interact and how we interact with them: changes *role relationships* and *networks* of relationships .
- When networks change, organizations change, because *organizations are networks*.



The Smartphone



Have you ever done this?



Have you ever done this?



Have you ever done this?



Why....

This

or

This

but not

This?



Just Remember



How Often Does This Happen?



How Often Does This Happen?



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How Often Does this Happen?



Why.....

This

but not

This

or

This?



First and Second Order Effects

● First Order Effects

- Economic
- Quick
- Practical
- Relatively predictable
- Relatively easy to measure

● Second Order Effects

- Socio-cultural
- Slow but pervasive
- Critical but not practical
- Hard to predict
- Harder to measure

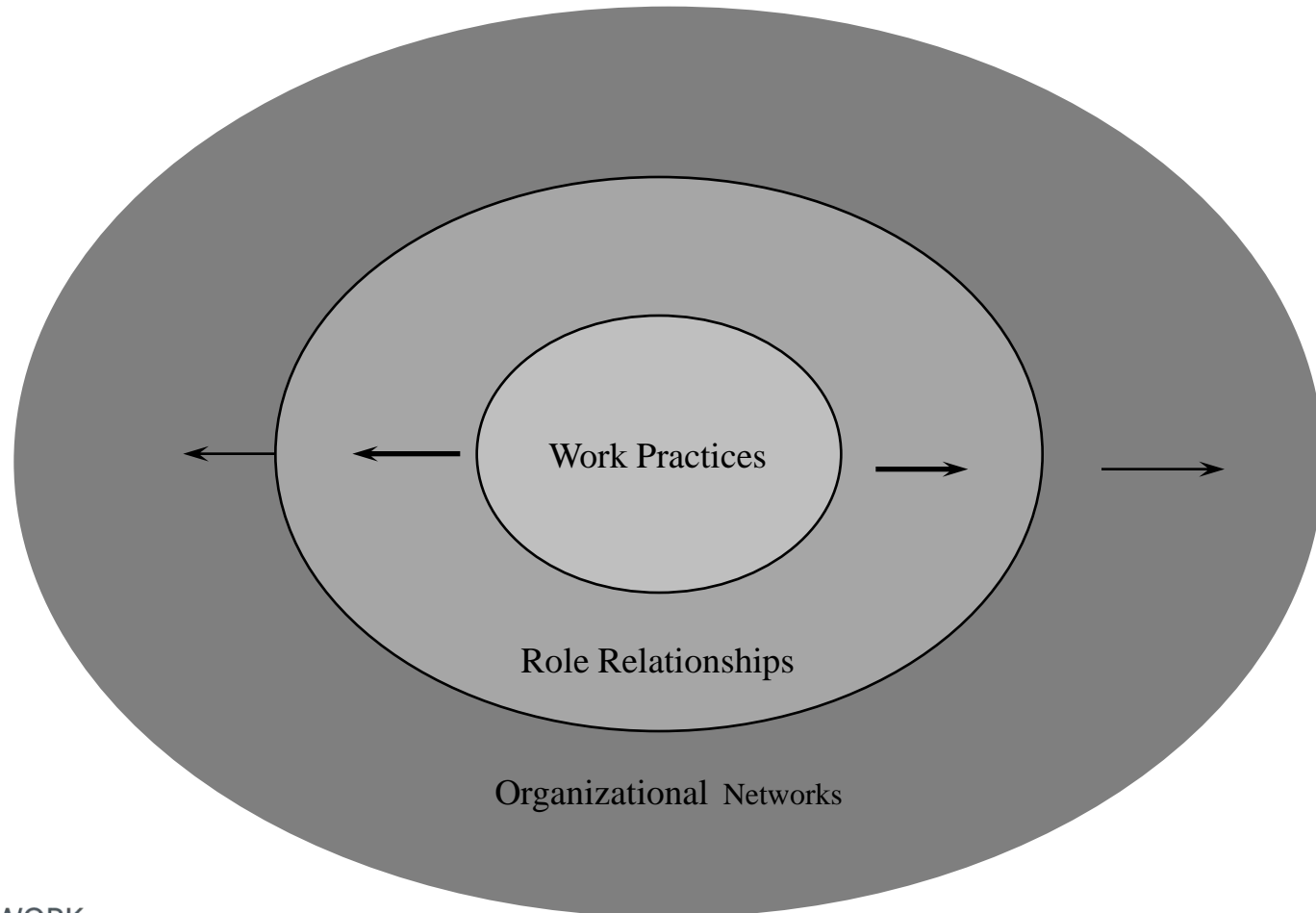


What Technologies Can Change

- Work Practices
 - What we do
 - How we do it
- Relationships
 - With whom we interact
 - The nature of our interactions



How Technologies Change Organizations



Computerized Medical Imaging



CT Scanner



Ultrasound



Digital Subtraction
Angiography

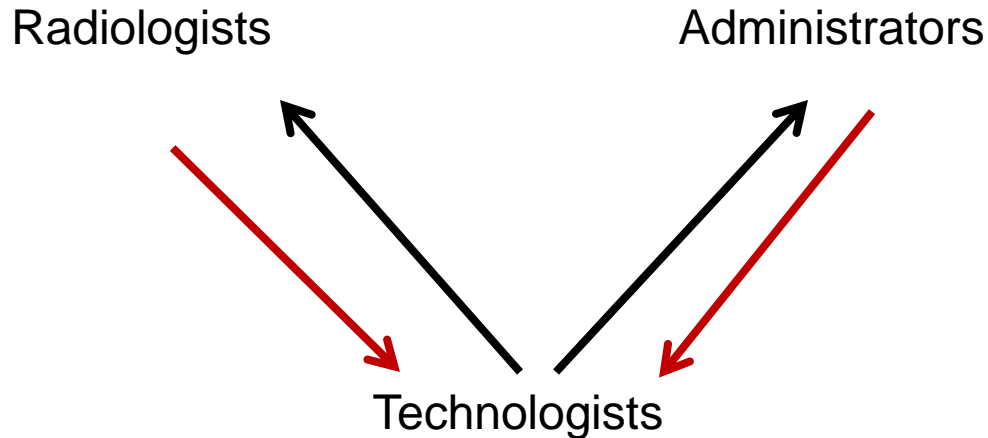


Xray and Flouroscopy



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Flow of Information and Orders in Routine X-ray

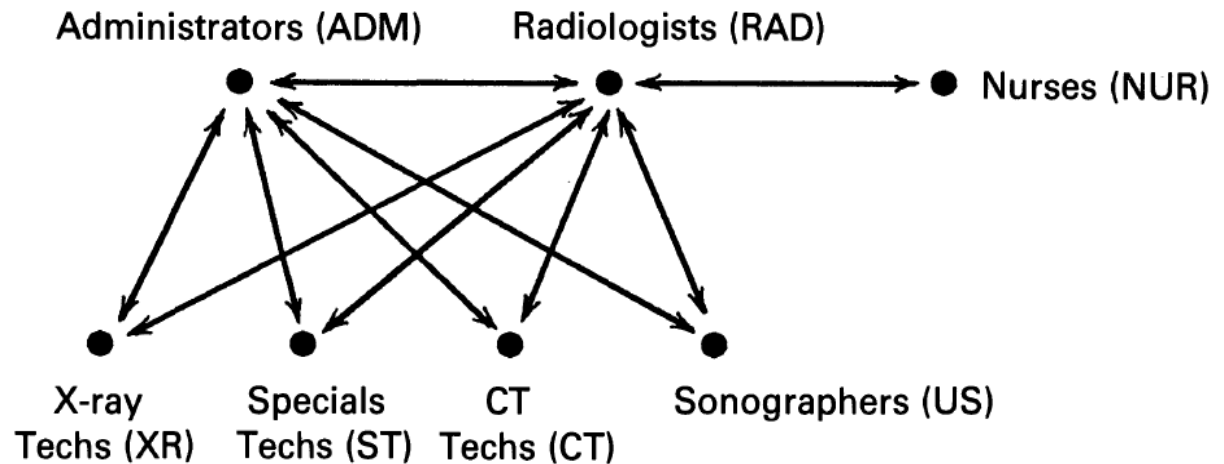


→ Information/Data
→ Orders/Control

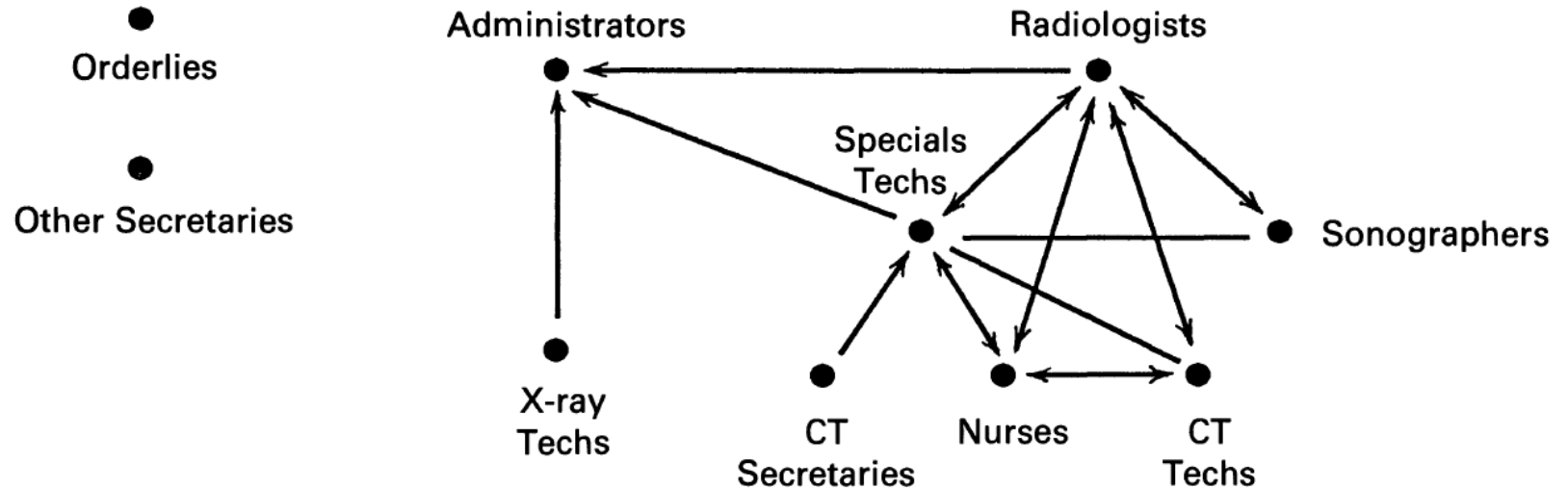


Role Structure According to Job Descriptions

- CT Secretaries (CTS) ●
- Other Secretaries (SEC) ●
- Orderlies (ORD) ●



Actual Role Structure



The lot



The Showroom



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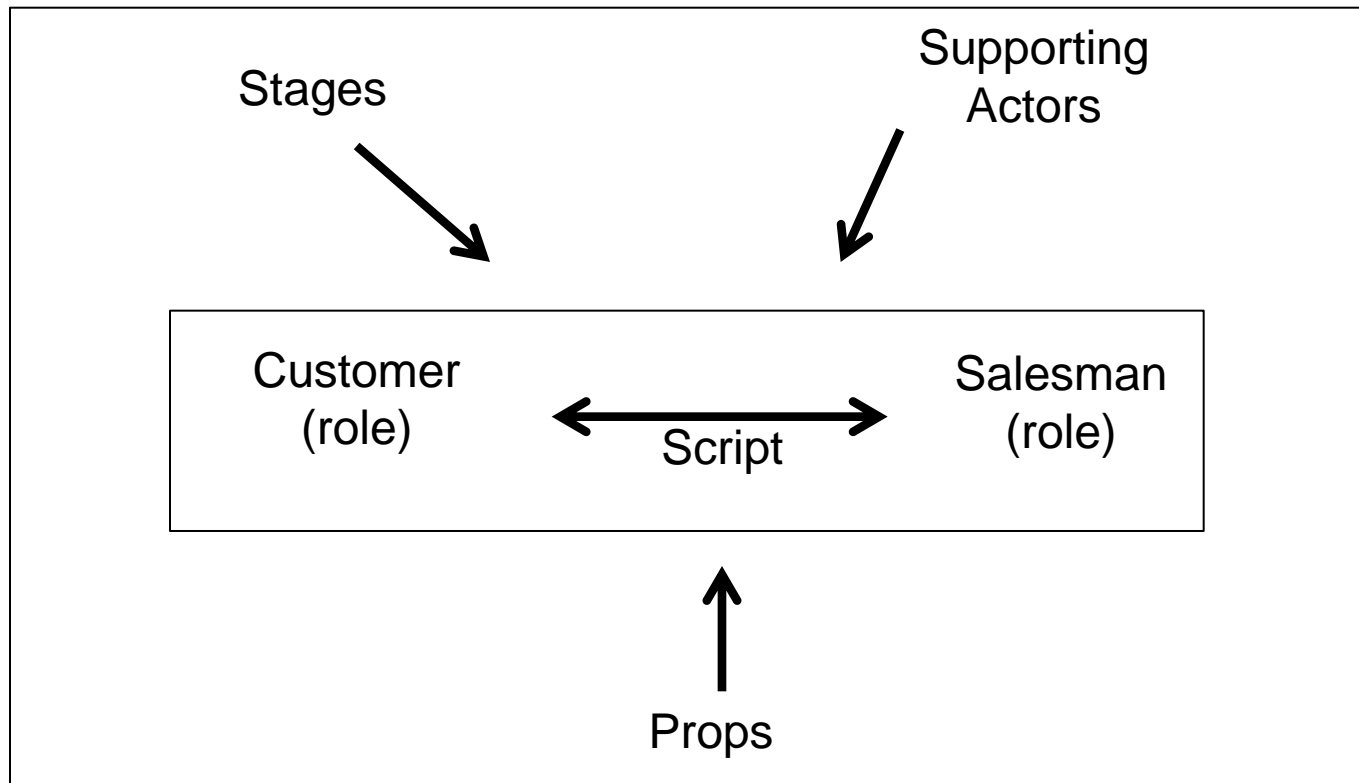
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The Salesmen



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The Car Sales Encounter



Scripts

Scripts exist as both cognitive and behavioral phenomena. Cognitively, scripts are expectations about how things ought to go in a type of situation. When our expectations are fulfilled we have the sense that “nothing-out-of-the-ordinary-is-going-on-here,” even though we are not likely to be aware that we are experiencing a sense of the usual. Behaviorally,....scripts are loosely prescribed, sequences of actions and interactions associated with types of encounters or scenes. (Barley, 2014)



Restaurant Script

1. Maître d' greets you
2. Maître d' takes you to your table
3. Maître d' seats you and hands you a menu
4. Bus boy brings water and perhaps bread
5. Waiter introduced him/herself and takes your drink order
6. Waiter brings drinks and tells you about specials.
7. Waiter asks if you are ready to order
- .
- .
- .
- N. You pay bill and leave

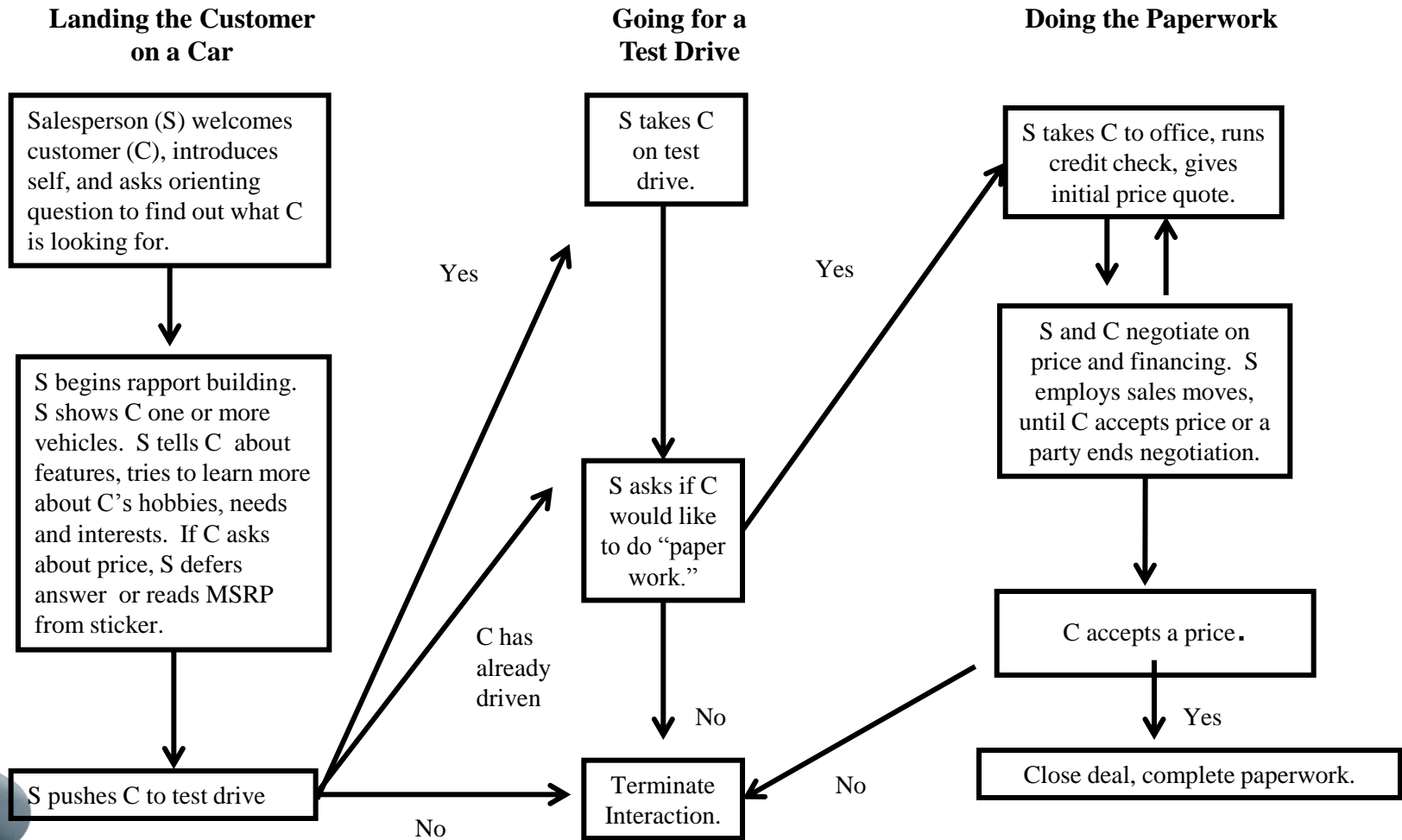


Fast Food Script

- Food is cooked
- You arrive, approach counter, wait in line
- Counter person asks what you would like
- You order
- You Pay
- You wait
- Meal is assembled
- You take food to the table
- You eat
- You bus your table



The Floor Script



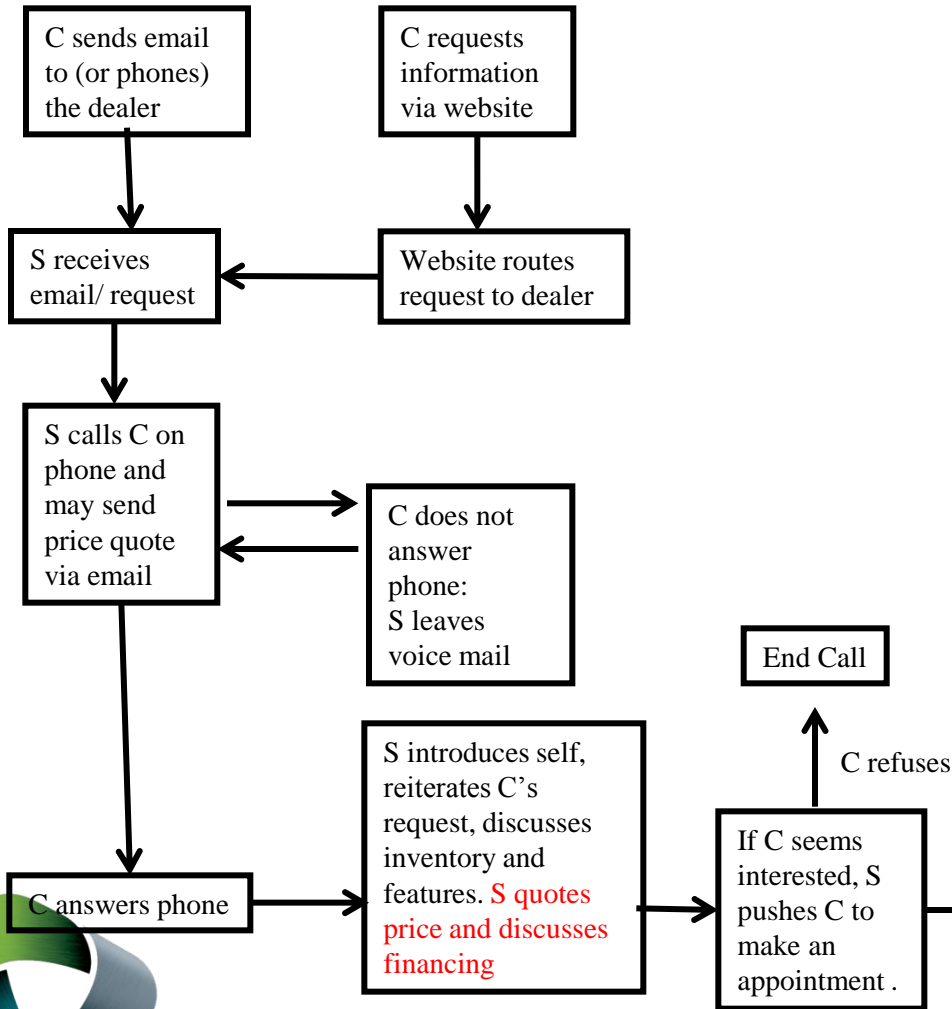
Emergence of Internet Car Sales

- Auto-by-tel, the first internet site founded in 1995.
- 1997 GM is the first car company to announce that it will sell cars online.
- Costco, an affinity group, enters in 1998
- By 2007...
 - 67% of people who purchase a new vehicle used the internet for research.
 - 12.4% bought from a dealer recommended by an internet site.
 - 94% of dealers have some kind of site.
 - People who buy via the internet pay 2% less than floor customers for the same car (Morton et al. 2001)
 - Internet purchasing erases cost disadvantage of being a minority (Morton et al. 2003)

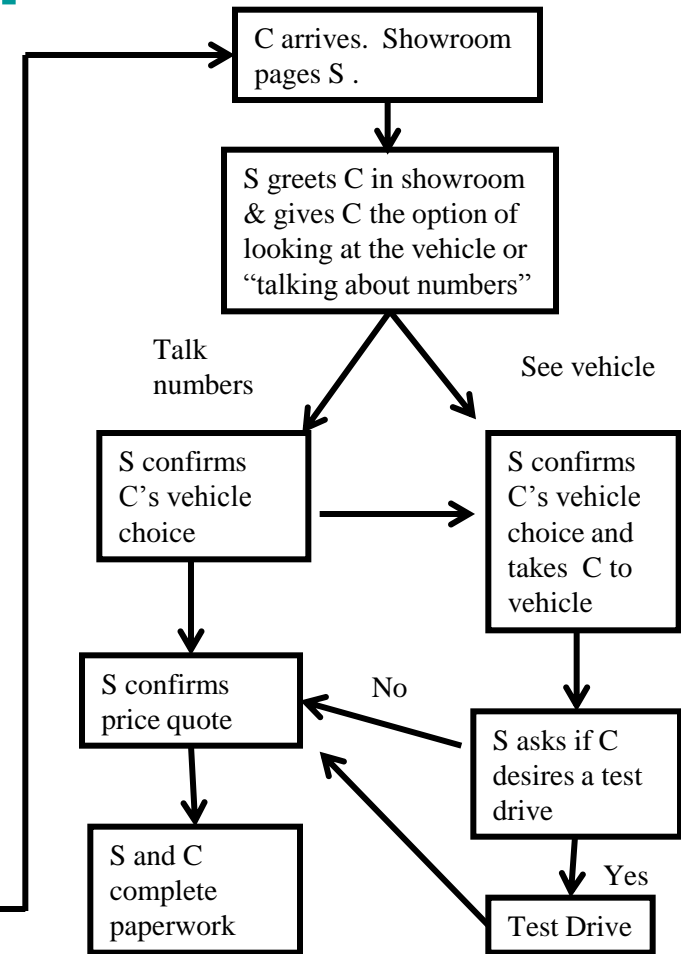


Internet Script

Phone Encounter



Face to Face Encounter



Percentage of Floor and Internet Sales with Specific Moves

Move	Floor	Internet
Need to make profit/ commission	21%	0%
Create urgency	23%	9%
Depreciate alternatives	16%	4%
Ignore customer comment	23%	0%
Double team	11%	0%
Turn the customer	16%	0%
Neutralize internet data	8%	30%
Any sales move	61%	43%



What Customers Say about Floor Sales

Joan began by saying that [the car buying process] is horrible and she absolutely hated it. “When I go to a dealership and they see a single woman walking in, they won’t talk straight. They won’t answer my questions.” Her husband nodded and he added, “It’d be good if the buying process were streamlined and the people straightforward. Just come out and provide reasonable options for the customer to choose from.” (*Chevy Fieldnotes*)



What Customers Say about Internet Sales

Kevin looked online on autotrader.com....He went to other dealers and dropped by Silicon Valley Toyota last night to check the condition of the vehicle listed by Internet Sales. (He called ahead to make sure the car was still here.) He test-drove it last night, but since the car was a little more (\$2,000) than his budget (\$20,000), he had to go home and think about it.... He went back online last night after he visited the dealer and looked at how "comparable" the other cars were. "These guys weren't pushy," and Chris appreciated that. He adds, "Some people are real pushy. (*from Toyota Fieldnotes*)





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Organizations Adopted Email Because....

- Allowed nearly instantaneous communication even over long distances
- Reduced the cost of postage, stationary, and eventually secretarial labor.
- It was asynchronous – (no more phone tag)



But now....

- We feel like we are drowning in email
 - Spam
 - Endless cc's
 - Email arrives day and night -- it's relentless
 - Distribution lists
- Email drives out other work
- Source of Stress



Informants Logged their Communications

Stanford Communication Log

Date _____ (Note: Start each day on a new page) Arrived at work at: _____ Left work at: _____ Typical Day: Yes ___ No ___

Start time	End time	Location	Planned	Importance	Medium	Initiator	Number of others	# Received	# Responded to or forwarded	# Initiated (new)
		<input type="checkbox"/> Office <input type="checkbox"/> In own building <input type="checkbox"/> Other Sun location <input type="checkbox"/> Customer Site <input type="checkbox"/> Home <input type="checkbox"/> Car <input type="checkbox"/> Airport <input type="checkbox"/> Other _____	<input type="checkbox"/> Yes <input type="checkbox"/> No	___ 1. Low ___ 2. _____ ___ 3. Moderate ___ 4. _____ ___ 5. Extremely	<input type="checkbox"/> Face to Face <input type="checkbox"/> Land Phone <input type="checkbox"/> Cell Phone <input type="checkbox"/> Pager <input type="checkbox"/> Teleconference <input type="checkbox"/> Video Conf <input type="checkbox"/> Instant Mess <input type="checkbox"/> Chat Room <input type="checkbox"/> News Group	<input type="checkbox"/> Self <input type="checkbox"/> Other	(number) <input type="checkbox"/> Sun Personnel <input type="checkbox"/> Customer <input type="checkbox"/> Vendor <input type="checkbox"/> Family <input type="checkbox"/> Other Personal <input type="checkbox"/> Other	(number) <input type="checkbox"/> Sun Personnel <input type="checkbox"/> Customers <input type="checkbox"/> Vendors <input type="checkbox"/> Family <input type="checkbox"/> Other personal <input type="checkbox"/> Broadcast	(number) <input type="checkbox"/> Sun Personnel <input type="checkbox"/> Customers <input type="checkbox"/> Vendors <input type="checkbox"/> Family <input type="checkbox"/> Other personal <input type="checkbox"/> Broadcast	(number) <input type="checkbox"/> Sun Personnel <input type="checkbox"/> Customers <input type="checkbox"/> Vendors <input type="checkbox"/> Family <input type="checkbox"/> Other personal <input type="checkbox"/> Broadcast
Describe	<input type="checkbox"/>				<input type="checkbox"/> Email <input type="checkbox"/> Voice Mail					
		<input type="checkbox"/> Office <input type="checkbox"/> In own building <input type="checkbox"/> Other Sun location <input type="checkbox"/> Customer Site <input type="checkbox"/> Home <input type="checkbox"/> Car <input type="checkbox"/> Airport <input type="checkbox"/> Other _____	<input type="checkbox"/> Yes <input type="checkbox"/> No	___ 1. Low ___ 2. _____ ___ 3. Moderate ___ 4. _____ ___ 5. Extremely	<input type="checkbox"/> Face to Face <input type="checkbox"/> Land Phone <input type="checkbox"/> Cell Phone <input type="checkbox"/> Pager <input type="checkbox"/> Teleconference <input type="checkbox"/> Video Conf <input type="checkbox"/> Instant Mess <input type="checkbox"/> Chat Room <input type="checkbox"/> News Group	<input type="checkbox"/> Self <input type="checkbox"/> Other	(number) <input type="checkbox"/> Sun Personnel <input type="checkbox"/> Customer <input type="checkbox"/> Vendor <input type="checkbox"/> Family <input type="checkbox"/> Other Personal <input type="checkbox"/> Other	(number) <input type="checkbox"/> Sun Personnel <input type="checkbox"/> Customers <input type="checkbox"/> Vendors <input type="checkbox"/> Family <input type="checkbox"/> Other personal <input type="checkbox"/> Broadcast	(number) <input type="checkbox"/> Sun Personnel <input type="checkbox"/> Customers <input type="checkbox"/> Vendors <input type="checkbox"/> Family <input type="checkbox"/> Other personal <input type="checkbox"/> Broadcast	(number) <input type="checkbox"/> Sun Personnel <input type="checkbox"/> Customers <input type="checkbox"/> Vendors <input type="checkbox"/> Family <input type="checkbox"/> Other personal <input type="checkbox"/> Broadcast
Describe	<input type="checkbox"/>				<input type="checkbox"/> Email <input type="checkbox"/> Voice Mail					
		<input type="checkbox"/> Office <input type="checkbox"/> In own building <input type="checkbox"/> Other Sun location <input type="checkbox"/> Customer Site <input type="checkbox"/> Home <input type="checkbox"/> Car <input type="checkbox"/> Airport <input type="checkbox"/> Other _____	<input type="checkbox"/> Yes <input type="checkbox"/> No	___ 1. Low ___ 2. _____ ___ 3. Moderate ___ 4. _____ ___ 5. Extremely	<input type="checkbox"/> Face to Face <input type="checkbox"/> Land Phone <input type="checkbox"/> Cell Phone <input type="checkbox"/> Pager <input type="checkbox"/> Teleconference <input type="checkbox"/> Video Conf <input type="checkbox"/> Instant Mess <input type="checkbox"/> Chat Room <input type="checkbox"/> News Group	<input type="checkbox"/> Self <input type="checkbox"/> Other	(number) <input type="checkbox"/> Sun Personnel <input type="checkbox"/> Customer <input type="checkbox"/> Vendor <input type="checkbox"/> Family <input type="checkbox"/> Other Personal <input type="checkbox"/> Other	(number) <input type="checkbox"/> Sun Personnel <input type="checkbox"/> Customers <input type="checkbox"/> Vendors <input type="checkbox"/> Family <input type="checkbox"/> Other personal <input type="checkbox"/> Broadcast	(number) <input type="checkbox"/> Sun Personnel <input type="checkbox"/> Customers <input type="checkbox"/> Vendors <input type="checkbox"/> Family <input type="checkbox"/> Other personal <input type="checkbox"/> Broadcast	(number) <input type="checkbox"/> Sun Personnel <input type="checkbox"/> Customers <input type="checkbox"/> Vendors <input type="checkbox"/> Family <input type="checkbox"/> Other personal <input type="checkbox"/> Broadcast
Describe	<input type="checkbox"/>				<input type="checkbox"/> Email <input type="checkbox"/> Voice Mail					

If you are at the end of the day, check the box labeled "describe" for any communication events that were disruptive or emotionally intense and then briefly describe what happened.

Surprisingly....

The number of emails a people received **did not increase the number of hours they worked!**

BUT

Meetings and especially **Teleconferences** did.



Nevertheless...

The more time people spent doing email, the more stress they reported. (*Meetings and Teleconferences were unrelated to stress*)

AND

Email was the only medium that elicited anger and frustration.



Cultural Norms Surrounding Email

- If you miss something that was in an email it's your fault and the sender can chastise you not knowing.
- When you get an email you must respond quickly – ideally within a few hours.
- It's OK to send email at any time of the day or night.

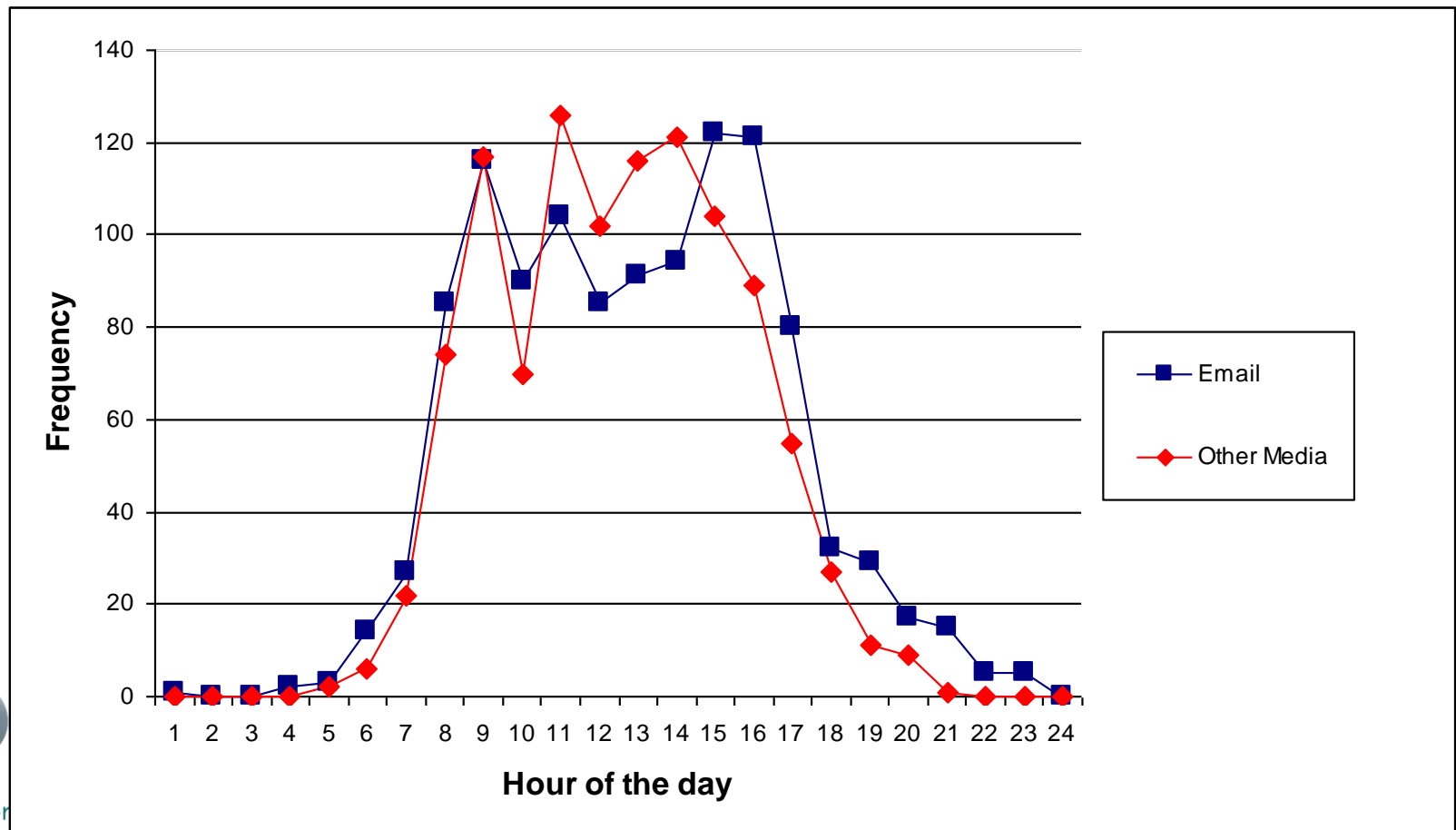


Email Enabled Experimentation the Spread of Distributed Teams

- Most of our informants were on multiple distributed teams.
- Many team mates were in Europe or Asia -- 8 or more time zones away.
- Their email arrived during the night and was waiting when they woke up in the morning
- Thus, the minute they woke up, they were already behind



The Temporal Distribution of Communication Events



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