

# BUYING TIME

A FRESH TAKE ON RETAIL PURCHASING

CARNEGIE MELLON | MHCI | SPRING '16

RESEARCH REPORT



*Our goal is to design a solution  
that supports more informed buying decisions  
and enables retail buyers and vendors  
to engage in the buying process  
more effectively.*

## EXECUTIVE SUMMARY

Team Duè and LH Ventures partnered to delve into the retail buying process and uncover areas that are ripe for disruption using human-centered design. Our goal is to help retail buyers consistently make the best possible purchasing decisions so they never lose a sale. Our solution will help retail buyers feel like heroes who always have exactly the product their customers want.

PROBLEM SPACE	RESEARCH PROCESS	KEY FINDINGS
<p>How did that new shirt you just bought make its way to the store? Every day, retail buyers make decisions that determine what products are available to you, the consumer. The cumulative decisions of a retail buyer affects the success of their company. However, their decision-making process is not wholly data-driven, and their communication with vendors is inefficient.</p>	<p>Over a period of four months, our team conducted over a hundred hours of user-centered research, including contextual inquiries, interviews, surveys, artifact analyses, and empathy-building activities, to identify the motivations and processes of buyers and the stakeholders influencing them.</p>	<p>We identified opportunity spaces for a new tool to help both buyers and vendors get their jobs done more efficiently, without sacrificing the thrill of a good deal. We'll use these findings to guide us as we build iterative prototype in the summer semester.</p>



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## WHAT IS RETAIL BUYING?

Retail buying involves planning, sourcing, and purchasing of a range of products on behalf of a retailer. Retail buyers—more commonly just “buyers”—determine what products appear on a retailer’s shelves or online. For example, a buyer working at Target might purchase goods from hundreds of product vendors to maintain and develop the assortment of small home storage products Target offers.

### IT'S PEOPLE

Personal relationships drive retail buying. Buyers maintain relationships with hundreds of vendors. Personality and interpersonal communication are foundational skills for buyers. Most retail buying takes place in person, surrounded by stacks of sample products, and reports.

### IT'S TRENDS

Buyers who work with fashionable products must anticipate and adapt their purchases to consumer trends and preferences. While the demand for laundry detergent is fairly stable and predictable, the demand for trendy and fashionable products varies with season and can be surprisingly volatile.

### IT'S NUMBERS

Buyers monitor key performance indicators (KPIs) to track the success of previous purchases. Combined with their trend knowledge, KPIs and metrics help the buyer make better decisions.

### IT'S TECHNOLOGY

Buyers work with two different types of technology: communication and purchasing. For communication, buyers primarily rely on email to stay in contact with their team and vendors. For purchasing, buyers typically rely on in-house reporting software, Microsoft Excel, and a stack of printed sales and financial reports when buying.

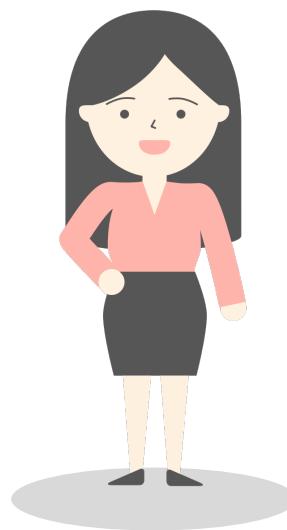
## WHO IS INVOLVED ?



### BUYER

The best parts of my job are the relationships I am able to form with my vendors and peers within my company. No two days are the same for me. Traveling for tradeshows and meetings, comp shopping, and looking for trends are part of what make my job so thrilling. "The numbers" help me to feel more confident making decisions for my customer.

*"I think my personality really helped me to become a good buyer"*  
-Off Price Buyer



### VENDOR

Not only do I need to make quality products to meet buyer standards, I need to make sure products are delivered on time and in good condition. Our personal relationship does not mean much if I'm not providing the products she needs. Buyers value our great personal relationships.

## THE BUYER LANGUAGE

The buying process is such a unique experience that buyers require their own lexicon of terms to communicate with each other and the people they work with on a day-to-day basis.

Their language includes highly specific terms and acronyms. Below are a few we will be using throughout the book.

### Assortment

The full range of products the store sells for a certain category (e.g. Bedding, Storage, Men's Sportswear)

### Open-to-Buy Dollars

The money that a buyer is budgeted by the company to spend for the month on buying products

### Purchase Order

An official document exchanged between the buyer and vendor to purchase items

### Point of Sale (POS) Data

The Data from cash registers that tracks which products a customer buys and for how much money

### Closeouts

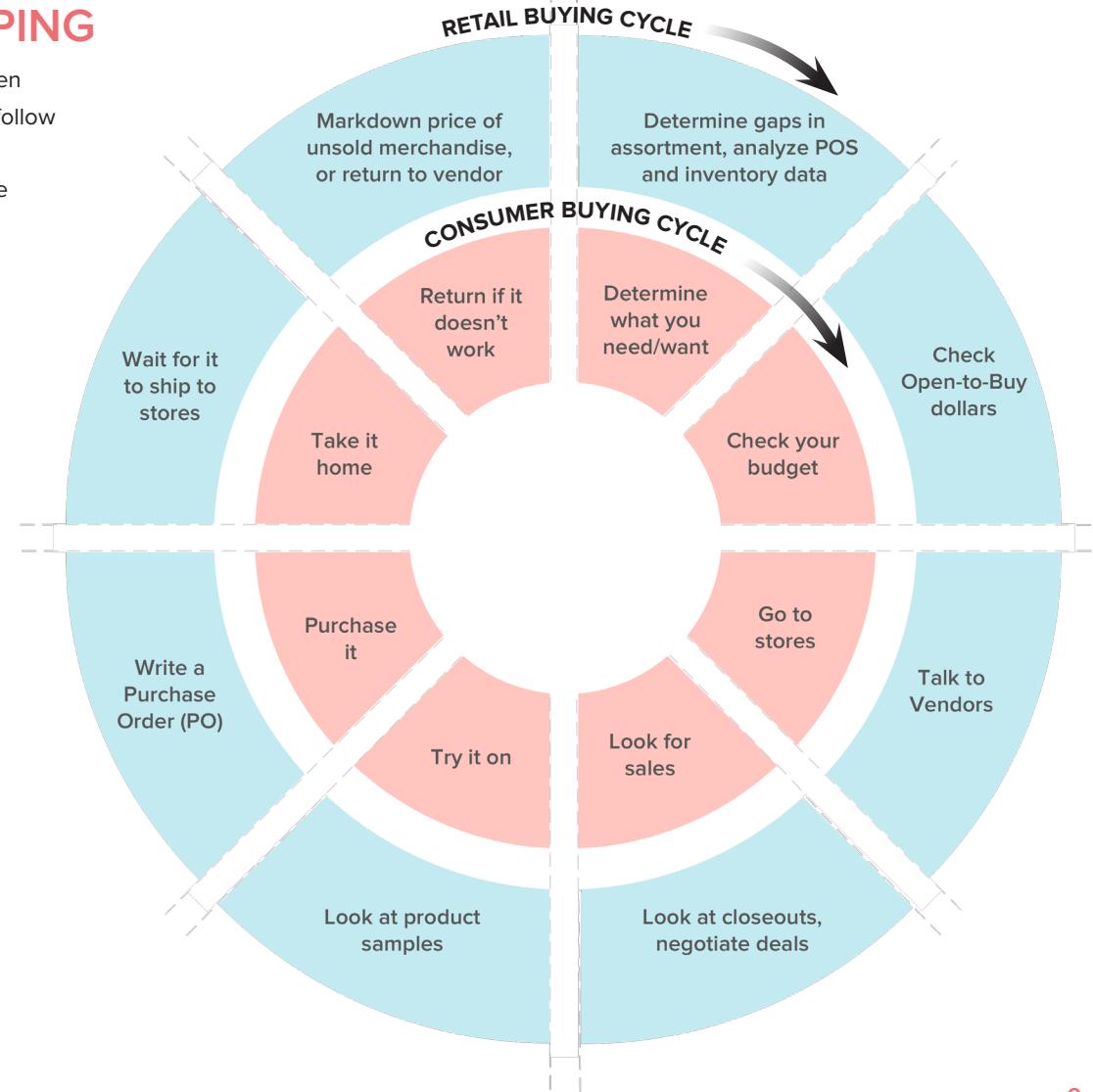
Items that vendors sell to buyers for a reduced price due to overstock

### Markdown

Putting an item on sale or clearance in store

## RETAIL BUYING VS. SHOPPING

Think of the process you go through when shopping for a new shirt or pair of shoes. Retail buyers follow a similar process to purchase a single product for their retailer. There are, however, some differences that come with scale. Our literature review revealed that while buyers and consumers evaluate product aesthetics similarly, they make their purchasing decisions differently. Buyers must rely on sales metrics and don't have time to dwell on a decision. If the product isn't a clear best-seller, they have to move on.



## THE BUYER PROCESS

Although retail buying is cyclical, single purchases can be understood as a linear process. The diagram on the right organizes the opportunities to improve the retail buying experience that emerged from our research. Each opportunity space belongs to one of four high level insights uncovered by our research. The following section will provide a detailed exploration of each of our four insights.

**[ ] Insight One**  
It's all about the thrill.

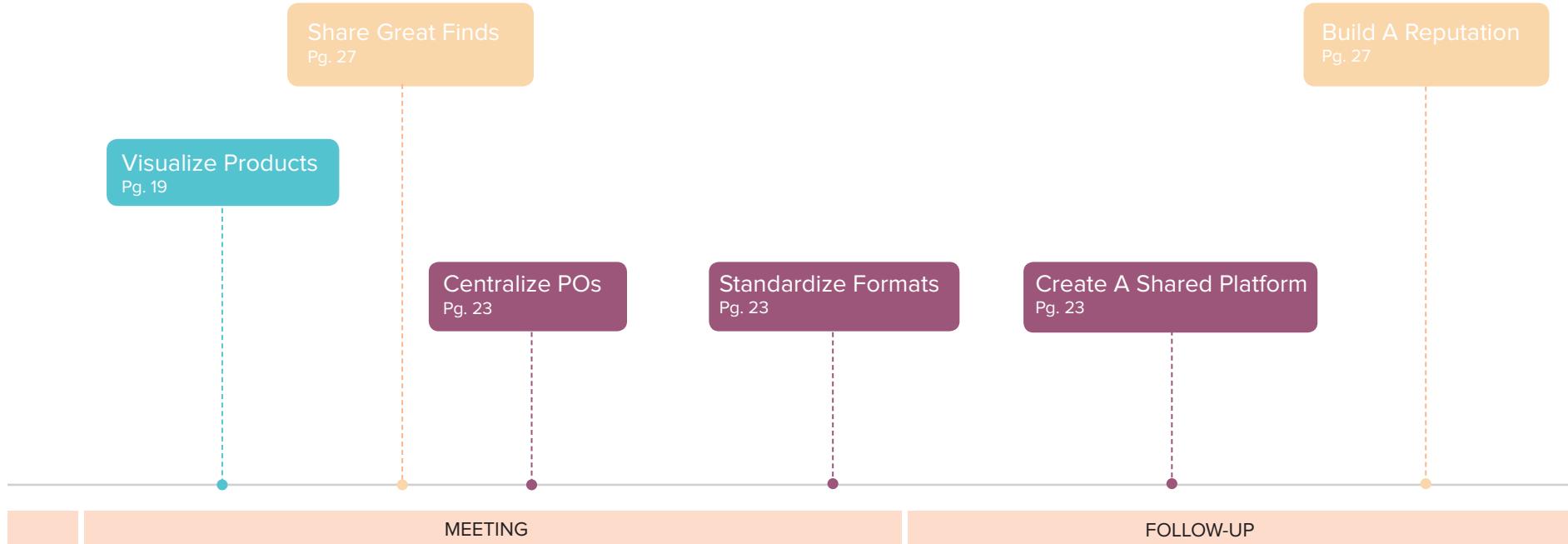
**[ ] Insight Three**  
Purchase orders are 20% work, but 80% headache

**[ ] Insight Two**  
Tools show buyers the haystack, but they're looking for the needle

**[ ] Insight Four**  
Buyers are putting together a puzzle, but they have to find the pieces



Before a buyer-vendor meeting, the buyer prepares by analyzing sales data and identifying gaps in her product assortment. She also shapes her strategy by shopping at competitors' stores, researching current fashion trends, and getting input from both store-level and corporate-level colleagues.



Buyer-vendor meetings are the exciting part: when the buyer negotiates over products with her vendor in an experience that's part friendly competition, part shopping, and part strategic betting. She reviews the product offerings her vendor has brought, and decides upon a selection to purchase.

After the meeting, the buyer and vendor communicate primarily by sending email attachments back-and-forth. Vendors send meeting recaps and completed PO Worksheets; buyers generate the final Purchase Order. When the shipment arrives in stores, the buyer tracks the products' sell-through and other metrics closely to see if her bet paid off.

AFTER 16 WEEKS OF RESEARCH,

WE ARRIVED AT FOUR INSIGHTS...



INSIGHT 1:  
**IT'S ALL ABOUT THE THRILL**

*“I buy off price because it’s more fun.  
There’s something new everyday”*

-Buyer from major off-price chain

*AT THE END OF THE DAY, BUYING IS FUN. THE FUN ISN'T ALWAYS EFFICIENT, BUT IT MAKES EVERYTHING WORTH IT.*

It can be tempting to deconstruct the buying process and try to optimize the most time intensive tasks. From a resource management perspective, it's only logical to focus your efforts on the least efficient tasks to realize the most gain. However, this kind of thinking does not create great experiences—in fact it can even damage existing ones. In-person buyer meetings require a incredible amount of time to plan, organize, travel, and conduct. Traveling to trade and fashion shows means time away from filling out POs and meeting with merchandising. But buyers consistently rank these meeting and travel activities as the most enjoyable parts of their work. Beyond only being enjoyable, these activities both represent crucial opportunities for buyers to gather trend insights, maintain relationships, and build new ones. For us, this means that to improve the buying process, any potential solution will need to pass a pretty challenging heuristic: the fun test.

## *Insight 1, continued*

### THE THRILL

The buyers we spoke to, especially the seasoned ones, seem to share the same sentiment about their work: they buy because it's fun. Most of the buyers we interviewed have a background either in business or merchandising. Of all of the positions that are available to people with their skillset, they chose to be buyers because there is something about the thrill of the deal that keeps them engaged. Some enjoy deals because it feels like shopping with someone else's money. Some enjoy deals because they like using tactical negotiation to get the best price. And some enjoy deals because it feels like a treasure hunt. But most of all, buyers like deals because they can get "her"—their customer—the best items possible.

### THE LETDOWN

Have you ever taken a vacation and halfway through you started to worry about the mounting stack of email in your inbox as work piles up while you're gone? Buyers often describe this feeling after traveling for a number of buying meetings. The POs just keep piling up. When it comes time to submit the work they feel rushed to get them out the door. Mistakes never look good, but an incorrect PO could mean an order for hundreds of completely the wrong product. Buyers want to be able to enjoy the more time intensive parts of their work without worrying about the follow up work getting out of hand in the meantime.



## PRESERVE THE THRILL

We see an opportunity to help buyers have more fun—either by reducing the time it takes to complete unenjoyable tasks, or by bringing joy to necessary parts of the process. Very few companies are creating tools specifically for buyers. Buyers need actionable information to make the best decisions, but they are given hand-me-down financial, sales, and product spreadsheets adapted from other department's designs. More information is not always better. Buyers simply lack the time and attention it would take to make full use of the information they are given in its current form. Below are three design heuristics that we have developed to help guide future development.

### Keep it Fun

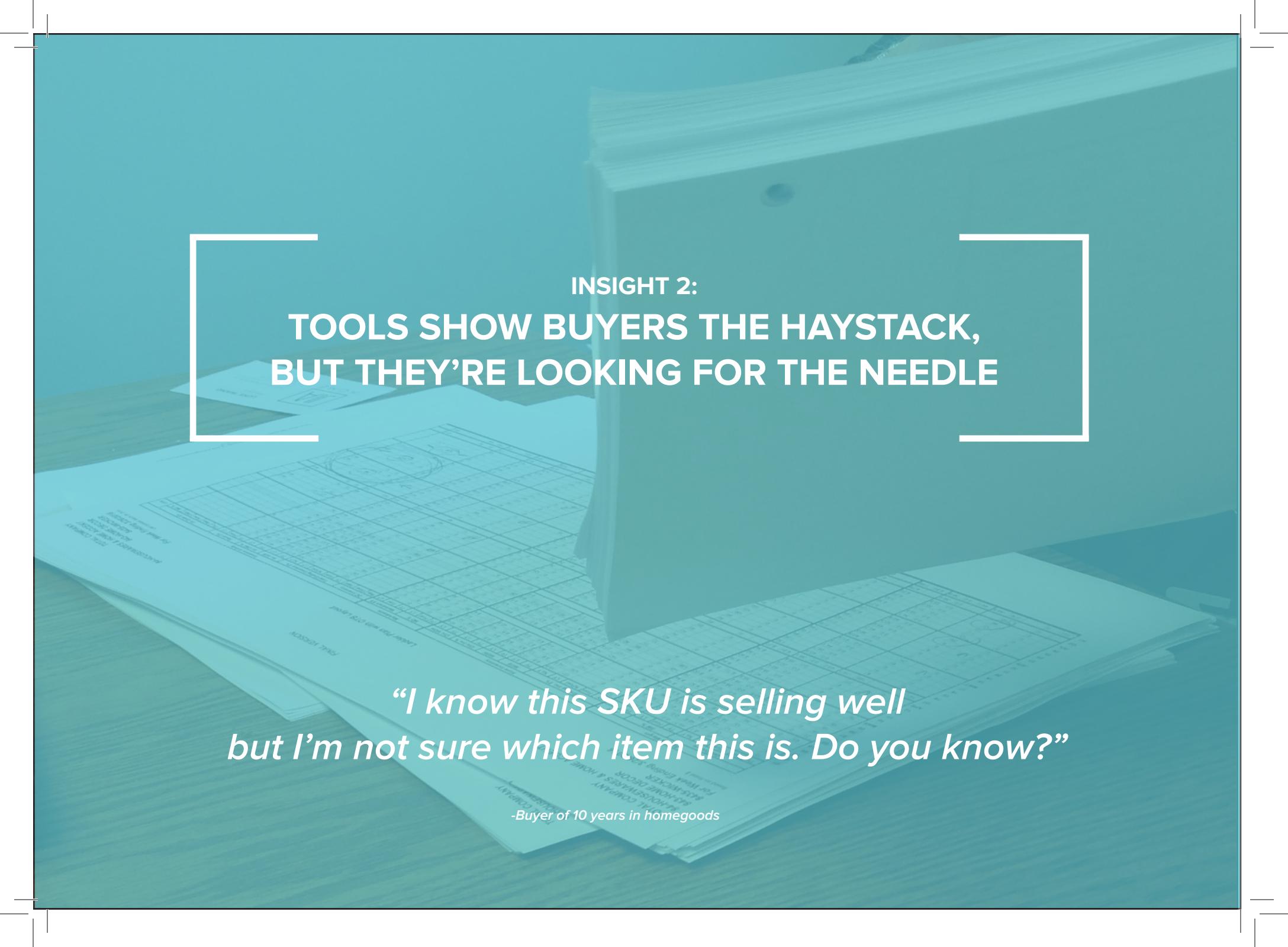
If it ain't broke, don't fix it. Each buyer has different strengths and preferences for different parts of the buying process. Some prefer to pour over the numbers, while others live for the personal interactions. But if there is one thing that we learned from sitting in on buying meetings: we need to keep the thrill of the deal. If our solutions is only as enjoyable as the status quo, we aren't fully considering buyer's needs.

### Play is Strategic

Buyers buy because it's fun. If it isn't fun anymore they will often find a different organization. Many of the buyers we interviewed have worked at at least one, sometimes many, previous retailers. Retaining talented buyers and attracting new ones, is an ongoing challenge facing every retailer. Although it varies from organization to organization, the individuals responsible for managing teams of buyers generally also have a say in what technology is purchased and implemented on the buyer's behalf. Creating an enjoyable buying experience will serve as a compelling strategic differentiator for our design.

### Make it Playful

When we observed the tools, portals, and software used by buyers it became clear that almost all of them are sanitized corporate reporting tools created for the widest number of potential users. For example, one buyer was using Microsoft Sharepoint to run all of their reports and purchase orders. Sharepoint is a generic corporate content management system that delivers a bland experience to almost every department. Designing interactions specifically for buyers gives us the opportunity to make it playful and appeal to buyers well tuned aesthetic sensibilities.



INSIGHT 2:

## TOOLS SHOW BUYERS THE HAYSTACK, BUT THEY'RE LOOKING FOR THE NEEDLE

*“I know this SKU is selling well  
but I’m not sure which item this is. Do you know?”*

-Buyer of 10 years in homegoods



### ***BUYERS MAKE PURCHASES ONE PRODUCT AT A TIME, BUT THEIR TOOLS DON'T PROVIDE ACTIONABLE INFORMATION FOR SINGLE PRODUCTS***

Buyers can easily purchase thousands of unique products per year from hundreds of different vendors, and often across disparate categories. Each product is purchased based on very specific aesthetic and physical qualities. However, weekly reports are geared toward stakeholders who primarily concerned with sales aggregates. While buyers must be aware of these, as they provide constraints, they become much less useful when making specific product decisions. Each product is only given one row in a 100+ page report. There are no associated images, so the buyer must piece together what they can from the name. Worst of all, every document has slightly different information overlap. In order to understand the full story of a product, buyers have to comb through several different reports, search their email, look for past POs, or even call their vendors for assistance. Buyers' attention is being diverted from understanding products to finding product information.



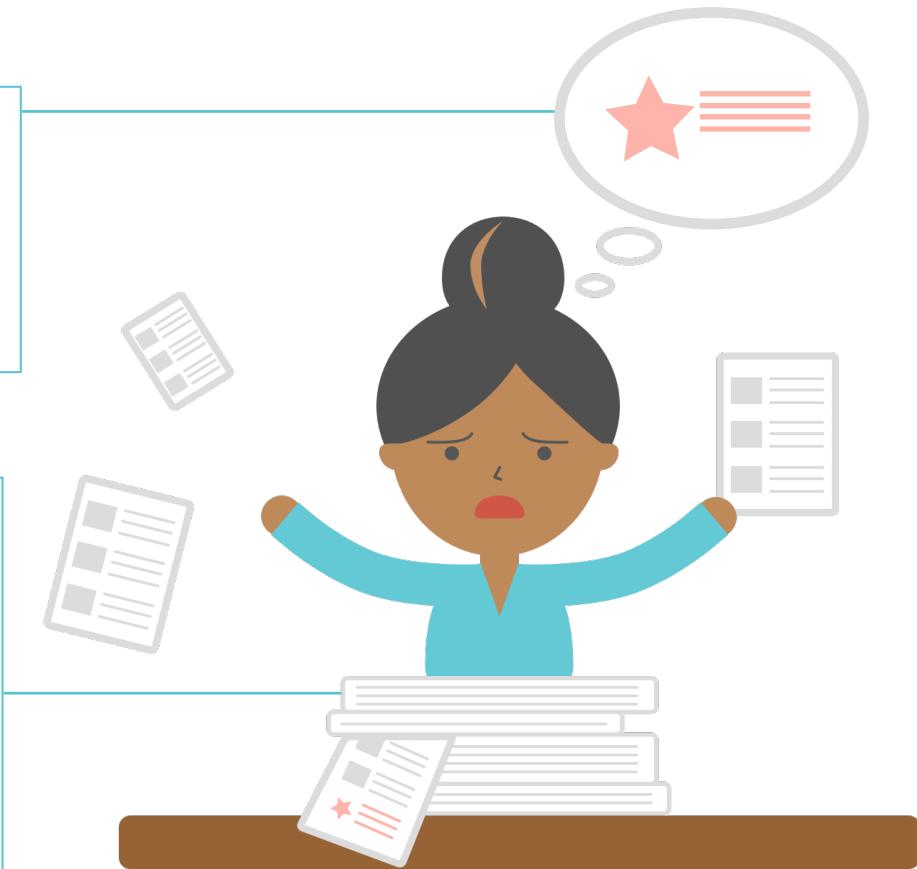
## *Insight 2, continued*

### THE NEEDLE

Top performing products inform future buying decisions. What characteristics of this product contributed to its success? How did this product do this time last year? During buyer-vendor meetings inconsistent product names and the lack of associated images causes confusion and delays in answering important questions. This can result in miscommunication and missed opportunities.

### THE HAYSTACK

When asked about the time spent combing through weekly product reports, buyers respond with an overwhelmed sigh. This weekly task takes their full attention on Monday mornings. Each category has different needs and considerations. Some seasonality and consumer preferences are not reflected in any reports and are only based on experience. Buyers are left to keep all of this information in their heads while analyzing their reports. Buyers live and breathe their products but the haystack of data they work with makes it difficult to pull out the needle of actionable information.



## MAGNIFY EACH PRODUCT

We see an opportunity to help deliver actionable information to buyers at a product level by creating a solution that stores product details needed to make informed decisions. This solution could potentially include both the buyer and vendor SKUs, last POs, POS data, images, notes from previous meetings, etc.

### Centralize products

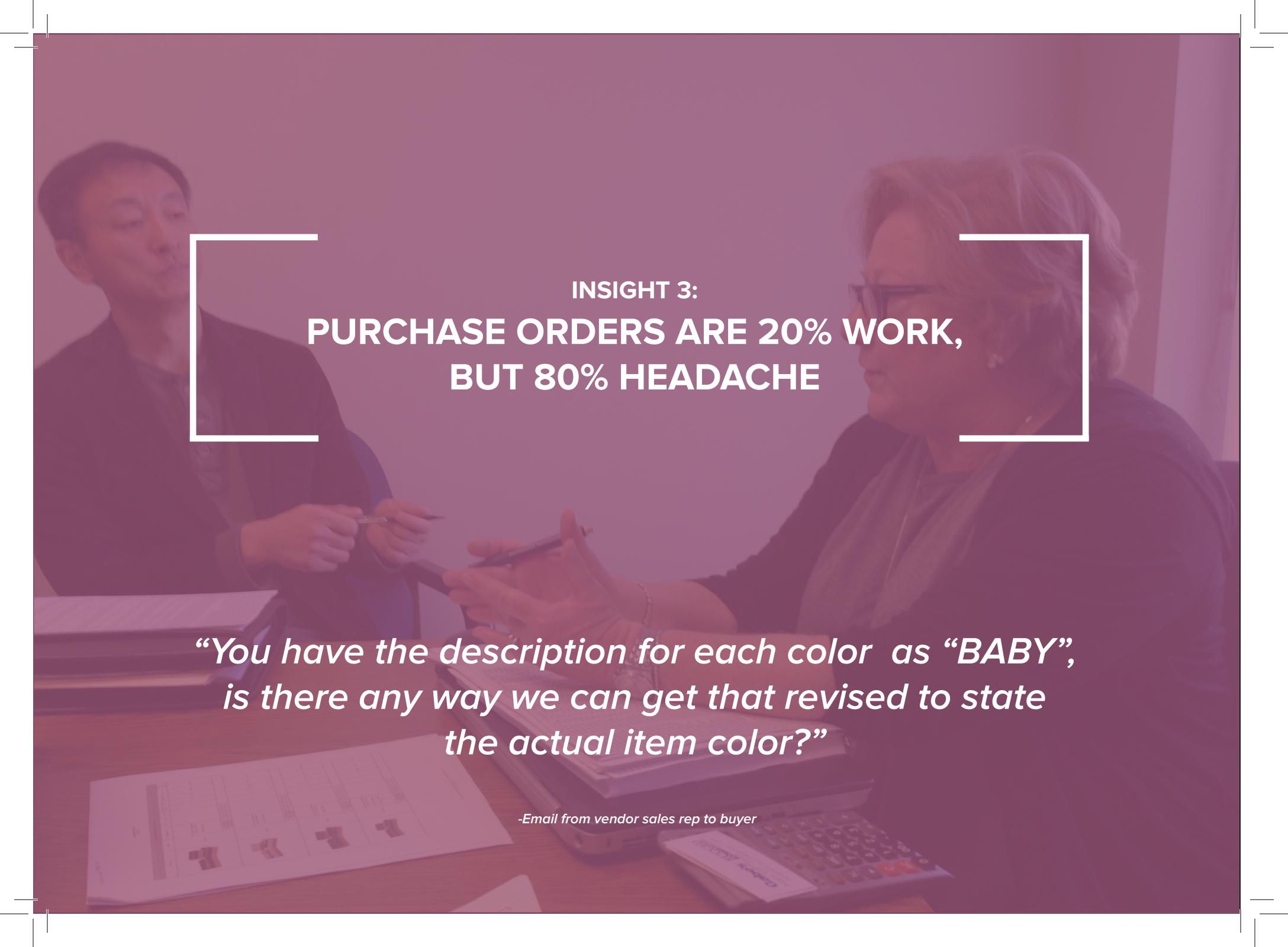
Each product has its own intricacies, and buyers have to keep all those details in their head, which can become overwhelming. We see an opportunity to create a tool that is built around individual products. Each product would provide actionable information needed to make a purchasing decision. Attaching notes to products would also greatly benefit new buyers trying to get up to speed on a category. Knowledge transfer is an important and unaddressed issue that leaves buyers with the sentiment: "God help the team that comes in after us."

### Highlight category characteristics

Although there are fundamental skills and traits that all buyers have, there are often very unique category characteristics. Some products are seasonal, some rely on subtler weather patterns, and some require consistency. With a product-centric tool, upon creation of the product, the buyer could add the necessary metrics to consider, mark flags for seasons/key hot periods, purchasing notes, etc.

### Visualize Products

A common problem buyers encounter is trying to visualize a product from an abbreviated couple word description on their reports. For existing items, if they are doing poorly, buyer want to know see them to try and understand if they are part of a trend. For new items, vendors provide samples along side a visual catalog. However, that catalog is the last time the product name and image appear together. And if the retailer changes the name of the product internally to match their standards, it becomes difficult to even cross reference against the buyer catalog. A buyer should be able to visualize the product at will to help provide context as they consider their purchase and spread. A successful tool for product visualization must have an easy process to add product photos and other key information quickly.



**INSIGHT 3:**  
**PURCHASE ORDERS ARE 20% WORK,  
BUT 80% HEADACHE**

*“You have the description for each color as “BABY”,  
is there any way we can get that revised to state  
the actual item color?”*

*-Email from vendor sales rep to buyer*



***SUBMITTING A PO IS BOTH THE BUYER'S AND VENDOR'S GOAL,  
BUT CURRENT PROCESS IS ARDUOUS AND ERROR-PRONE.***

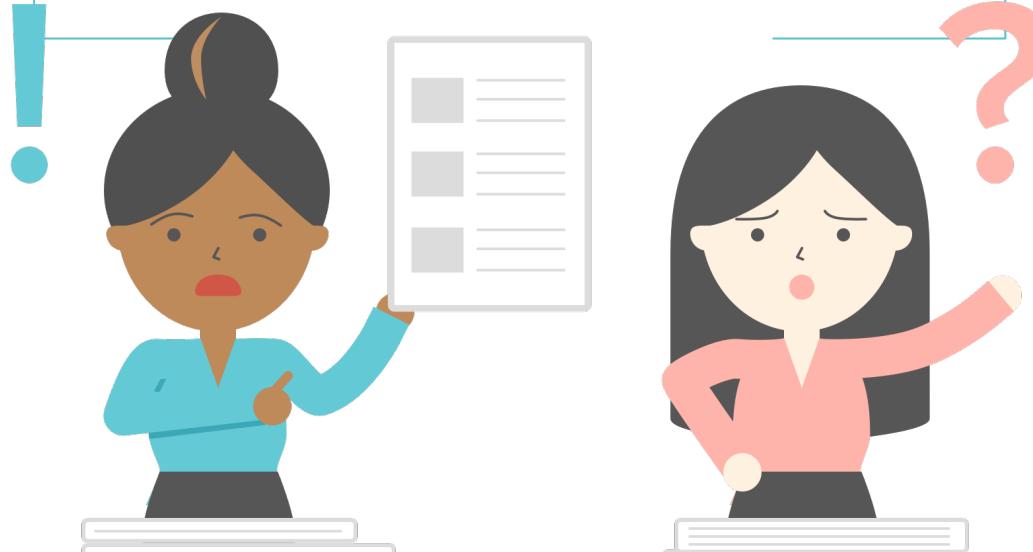
After a buyer verbally commits to purchases in a meeting, the buyer relies on the vendor to then create a PO Worksheet and send it to the buyer. The format of the worksheet, typically an Excel sheet, is not conducive to the back-and-forth communications that often ensues. Both sides correct naming inconsistencies, order details, and fix other mistakes before an agreement is reached. During this process, buyers and vendors have limited insight into each other's approval and planning processes. Vendors may need to receive input from their manufacturers or PD teams while buyers can be held back by CMO approvals or other strategy conversations. The lack of transparency causes a lot of anxiety and nagging emails. We also observed buyers and vendors forget the rationale behind their decisions when looking back at previous POs. The current back and forth of information makes POs one of the more exasperating parts of their job.



### Insight 3, continued

#### NO JOINT EFFORT

Buyers and vendors do not have a shared platform to finalizing a PO. They work on their own platforms and simply update, export, and pass a now PO back and forth. Having no net means neither side knows if progress is being made. Transparency would alleviate the constant email update requests that we see happening between buyers and vendors currently.



#### NO STANDARD

Because buyers and vendors work on different platforms, both are trying to make their standards the stick. However, in practice this means that neither gets the full advantage of standardization. A third party solution could bridge the gap and allow both parties to engage on the same playing field.

#### NO RULE BOOK

Buyers and vendors come to the game of making a PO equipped with different tools, methods, and styles. Each company has different naming conventions, different PO worksheets, different number of people who they require approval from, and yet they are trying to achieve the same output.

## WORK BETTER TOGETHER

We see an opportunity to create a software that centralizes all POs and PO-related information into one tool to create and review POs efficiently.

### Create a shared platform

Because the PO has to be passed back and forth, it takes more time than necessary to complete a PO. We see an opportunity to create a shared, interactive PO that can be started live in meetings and completed afterwards. The platform could be used to track, approve, and submit the PO with the push of a button. When certain key steps are completed, the software provide notifications to both parties, reducing the need for any 'nagging' status updates email requests.

### Standardize formats

Given that buyers and vendors have different needs, it is unsurprising that the documents they exchange are often tailored to one party or the other causing a lack of shared, standardized reference values. Standardization has many benefits especially in reducing the number of revisions, a metric which can affect a buyer's job evaluations. The solution could allow information to be viewed in multiple ways or choose a singular format that complies to both parties' systems.

### Centralize POs

Buyers and vendors often reference previous purchases, but often both parties forget key details about their previous rationales. These details are crucial for making future informed decisions. On several occasions, buyers planned to put off reordering a product until the next meeting. Given the difficulty in reconstructing previous POs, it seems unlikely that this plan will be realized. A centralized PO could track revisions made to the document by either parties, chronicle decisions, create reminders and "snoozed" decisions, and include additional shipping and distribution information that occurs after the PO is finalized. Documents could be organized easily by vendor so that buyers no longer need to have hundreds of email folders for their vendor POs. This would greatly reduce the lead time for buyer and vendor to get on the same page, and serve as a single point of reference in the future.

A photograph of a woman with blonde hair, wearing a brown jacket, standing in a supermarket aisle. She is looking down at a shelf filled with various woven baskets and boxes. The shelves are white metal. In the background, there are more shelves and products. The lighting is bright, typical of a supermarket.

INSIGHT 4:

**BUYERS ARE PUTTING TOGETHER A PUZZLE,  
BUT THEY HAVE TO FIND THE PIECES**

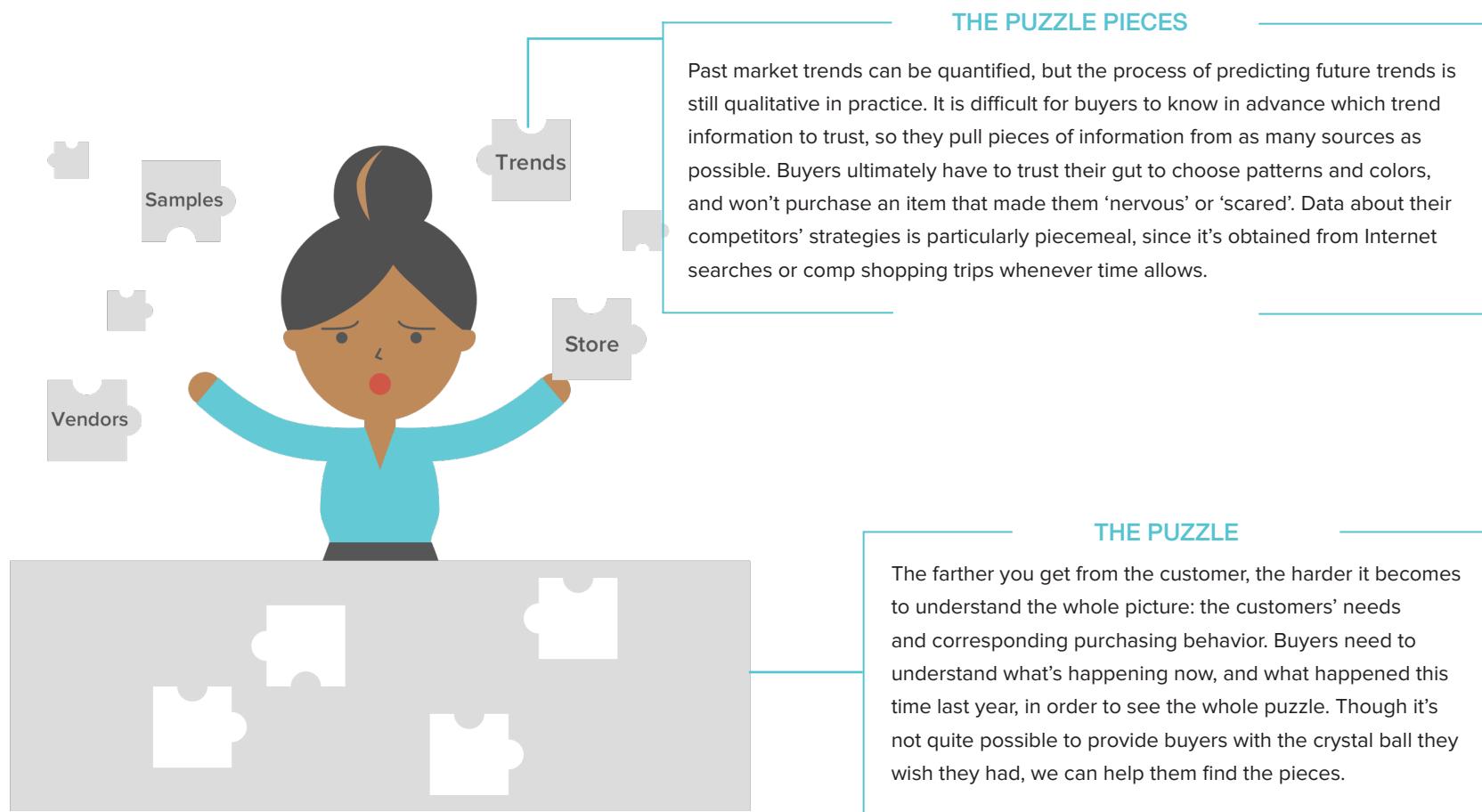
*“[The company] doesn’t give us real time data.  
They want us out in the market”*

-Buyer from major off-price chain



***BUYERS GET TREND INPUT FROM ALL DIRECTIONS,  
AND IT'S UP TO THEM TO SYNTHESIZE WHAT THEY CAN DURING PURCHASING TIME.***

Not all information can be conveyed in a spreadsheet. Buyers are expected to manage many different streams of information at the same time. Some information is pushed to buyers internally: sales information from weekly reports; product issues from regional managers; and corporate strategy from division merchandising managers, to name a few. However, the information provided to buyers is only a start. To make fully informed decisions buyers need to gather key supplemental information: pricing and new vendors from comp shopping; trending colors and styles from fashion shows and vendors; and product spread and strategy from internal trend boards and other buyers. Unlike the numbers and figures found in their weekly updates and POS data, this supplemental information, though critical to their strategy, comes to buyers in a chaotic and unorganized form.





## FILL IN THE BLANKS

We see an opportunity to help buyers pull together and share key supplementary information so they feel confident in their purchasing decisions.

### Organize comp shopping

Comp shopping photos provide tactical information for buyers, including price points, promotions and store layouts. Some buyers put this information into a manually maintained spreadsheet, maybe adding a price point. We think this process could be made easier: a mobile solution could allow buyers to take pictures of the product, a barcode/price tag scanner could digest its price, and a tagging system could allow buyers to add any more relevant information. Using this tool, buyers could make comp shopping easier to share and compare.

### Build a reputation

Buying is based on personal relationships. The best buyers have a reputation for constantly making great buys, and the best vendors for suggesting the perfect product. By sharing key supplemental information with their team, buyers and vendors could each position themselves as trend leaders in their category, and in the company as a whole.

### Share great finds

Comp shopping also provides strategic direction: which trends to pursue, and how a buyer can differentiate their assortment from competitors'. Buyers often comp shop higher tier stores for inspiration. Buyers also expect vendors to come prepared with customer research, marketplace insights and trend boards. These supplemental information tend to be verbal or stay hidden in notebooks unless another buyer specifically asks about them. We see an opportunity to help buyers document and share all of these great finds with their team.

**YOU MAY BE ASKING...**

HOW DID WE GET TO OUR INSIGHTS?

## RESEARCH METHODS

We employed numerous human-centered research methods to develop the insights presented in this book. An overview of our methods and relevant statistics are summarized below. Each method is described in detail on the next few pages with emphasis on the impact the results had on our design synthesis process.

STATISTICS	18 Hours	23 Participants	4 Sessions	11 Responses	23 Hours	49 Documents
METHOD	CONTEXTUAL INQUIRIES	INTERVIEWS	CARD SORTING ACTIVITIES	ONLINE SURVEY	EMPATHY BUILDING ACTIVITIES	ARTIFACT ANALYSIS
PARTICIPANTS	5 Retail Companies	Buyers Vendors DMM Inventory Planner Merchandise Planner Designers	Buyers Inventory Planner	Buyers Category Managers DMM	Team Due	Buyers Vendors



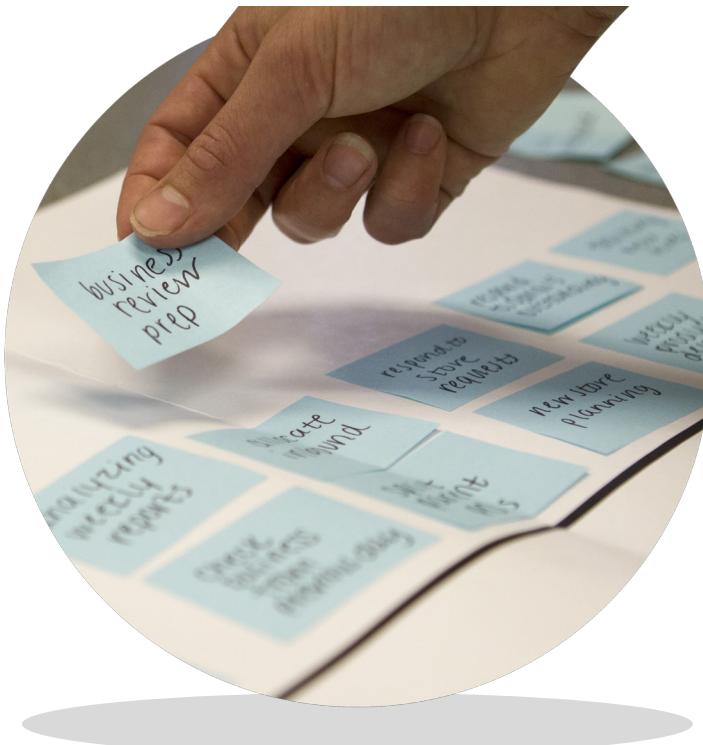
### CONTEXTUAL INQUIRY

On the surface, A contextual inquiry (CI) might look a lot like a traditional semi-structured interview. However, unlike a traditional interview, CI takes place in the context of use for the intended design. For us, this meant traveling to New York and West Virginia to directly observe buyer-vendor sales meetings—asking questions, and observing actual behaviors—to record rich information about work practices, the social, technical, and physical environments, and user tools. The output of our CI was a large contribution of raw data to our affinity diagram and to support the creation of many models, including our flow, cultural, personas, and user journey map.

### INTERVIEWS

Branching out from our core stakeholders, we conducted over fifteen interviews with individuals also involved in the retail buying and management processes. These interviews were primarily semi-structured, meaning they share a set of common questions and goals in order to focus the general area of research. However, because interviewees came from many different roles, the interviews had to be tailored to the individual. Although these interviews did not follow a strict script, the intention was to gather comparable information between interviewees. In addition to contextual inquiry, interview data also formed the raw data that fed into our affinity and models.





## EMPATHY BUILDING

The purpose of our empathy building activity was to gain firsthand experience with the difficulties that retail buyers face everyday—trying to understand their customer and make good purchasing decisions based on relatively little data. To accomplish this goal, we created Duè Shop: a shop where we sold goods based on forecasted consumer data. We experienced just how difficult making decisions as a buyer can be, but also how rewarding it can be when customers enjoy the products they purchase.

# CARD SORTING

Our card sorting exercise was conducted both in person and online. We asked participants to brainstorm a list of tasks their work entailed. From this list, participants were asked to arrange these tasks along a number of axes (for example, how enjoyable they find the tasks, or how much data is required to complete the task). Using this data, we were able to identify patterns of preference and behavior across stakeholders. This data directly contributed to the development of personas, user journey maps, and cultural models.





### ARTIFACT ANALYSIS

By collecting and analyzing representative documents, our team was able to identify and categorize additional, and more specific, breakdowns in the flow of information between buyers and vendors. This information will both inform design decisions at a high level (as we refer to the model generated from the analysis), and concretely (as we ensure that our final designs integrate well into existing tools and processes).



### SURVEYS

In order to validate our understanding of buyer preferences and experiences, we have also created and distributed a survey. This survey provides more quantitative support for our insights and models. The survey was distributed through a number of retail buyer LinkedIn groups, and directly to some of our contacts.

## OUR VISION

When we started this journey, the five of us knew little about retail buying. Since sitting in on multiple hours of buyer-vendor meetings, analyzing the documents buyers use, and even attempting to replicate the buying experience on a very small scale, we've come to empathize with our buyers. Buyers are confronted with overwhelming choices every day. It's difficult to look at your stores' shelves and regret a purchase.

Our goal is to design a solution that supports more informed buying decisions and enables retail buyers and vendors to engage in the buying process more effectively.

In other words...

*We want to make buyers  
feel like heroes.*

# ACKNOWLEDGMENTS

## CLIENT

### LH Ventures

*From the moment we heard that you were the very first client to sign up to sponsor a Capstone, we knew that you would be nothing but supportive. Thank you for providing us with this amazing opportunity.*

## SPONSORS

### Luke Wang

### Garrett Gilbertson

### Doug Heckmann

*Who would have thought that Capstone projects could be this fun? Thank you for providing us with the resources we needed to delve into this space, and for sharing your own stories with us. And most of all, thank you for constantly ensuring that we are having the best learning experience possible.*

## MENTORS

### Dave Bishop

### Skip Shelly

*If there's one message you taught us that will carry us through, it's that we need to make this project our own: choose what's best for the project, create our own research methods, take risks. Thank you for constantly pushing us to be better researchers, designers, and presenters.*

## PARTICIPANTS

*Thank you to our participants from many retail companies, both large and small. After interviews, card sorts, and trying out buying ourselves, we have come away in awe of the work that you do. Thank you for sharing your experiences with us. We are excited to design a tool that will help you feel like the heroes you are.*



*Pictured from left to right: Leeyat Slyper, Angela Liu, Paul Goodwin, Qianxu Zeng, Tarnisha Washington*

## MEET THE TEAM

### LEEYAT

Documentation Lead

#### Most Likely to be a DMM

Leeyat Slyper comes to Carnegie Mellon with a background in healthcare. She hopes to use her new skills to improve the usability of healthcare technology tools. In her spare time, she likes to make things out of clay while listening to country music. Give Leeyat some cheese and eggs, and she'll make you a killer quiche.

### ANGELA

Project Manager

#### Most Likely to be a Vendor

Angela Liu hails from San Francisco, CA. She studied Information Systems and Human Computer Interaction in her undergrad before continuing on to her master's in HCI. Most of her friends know she can't stay put in one spot for too long without needing to get up and move, especially if it's indoors. She's really talkative and often amuses herself more than her friends.

### PAUL

Research Lead

#### Most Likely to be a Buyer

Paul Goodwin is our token Canadian from Waterloo, ON. He studied Knowledge Integration at the University of Waterloo and has a background in instructional design. He hopes to use human-centered design to improve the usability of next generation 3D printing tools and technology. Given the opportunity, he would spend a sunny afternoon sailing or rock climbing.

### QIANXU

Technical Lead

#### Most Likely to be Paris Print

Qianxu Zeng comes from the spicy part of China. She studied Computer Science at Fudan University before coming to CMU. She always fills the team office with new and interesting snacks that she buys online. She aspires to be Ms. Robot, hacking as her full time job. She is extremely artistic and doodles more than she takes notes.

### TARNISHA

Design Lead

#### Most Likely to be PD

Tarnisha Washington is a military brat who has had the opportunity to live and travel around the world. She studied industrial design in her undergrad at Georgia Tech and continued to hone in her skill set with a masters in Human computer interaction. A food network advocate ,she loves cooking , and meeting new people that can teach her new things.

