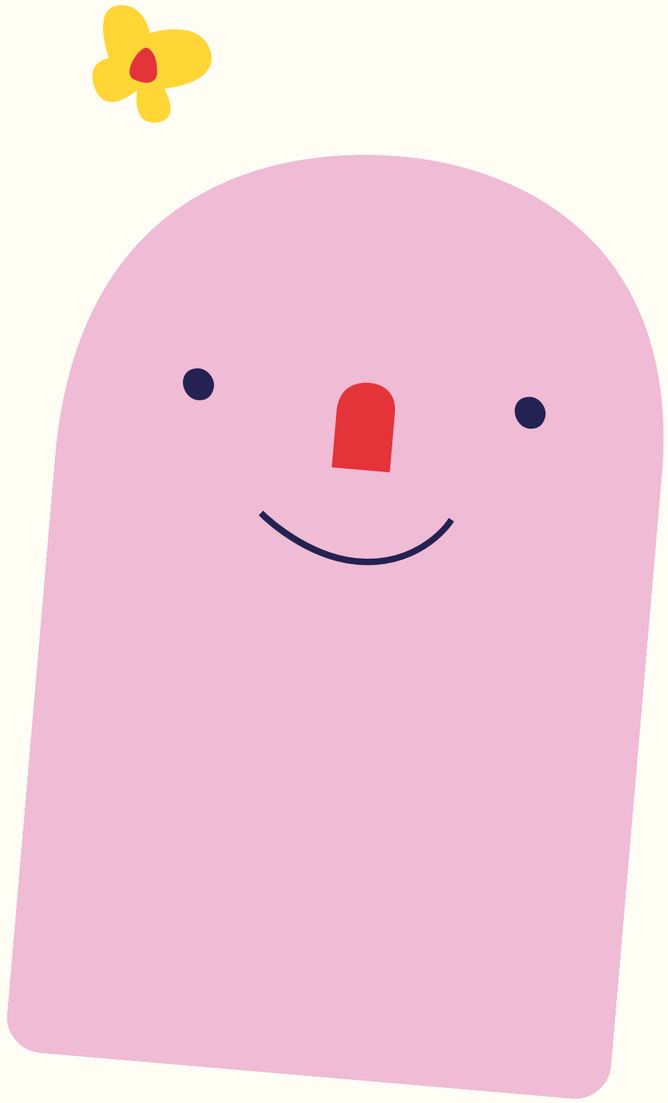
FURRYFUSION INC.

Database Design & Business Analysis
for a Stuffed Animal eCommerce Startup Business



WELCOME TO FURRY FUSION INC.

Your ultimate destination for the most adorable stuffed animals

We're here to bring you joy, comfort, and endless cuddles with our delightful collection of huggable companions. Whether you're looking for a **lovely panda**, a **chubby bear**, a **furious tiger**, or a **sloppy koala**, we've got it all.

Our mission is to make every hug a little bit happier, so dive into our world of furry wonders and find the perfect plush buddy to brighten your day!

DATABASE DESIGN - ENTITIES & DEFINITIONS

Entity	Definition
PRODUCTS	This table contains information about all products for sale.
ORDERS	This table contains information about the orders placed by customers.
ORDER_ITEMS	This table contains information about particular products purchased in each order.
ORDER_ITEM_REFUNDS	This table contains information about order refunds.
WEBSITE_SESSIONS	This table contains information about all website sessions of customers.
WEBSITE_PAGEVIEWS	This table contains information about the page views on the company website.

DATABASE DESIGN - METADATA

PRODUCTS

Attribute	Definition	Allowable Value	Example
product_id	Unique identifier for a product	Integer	1
created_at	When the product was added	Datetime	2013-01-01 12:00:00
product_name	Name of the product	String	Lovely Panda

DATABASE DESIGN - METADATA

WEBSITE_SESSIONS

Attribute	Definition	Allowable Value	Example
website_session_id	Unique identifier for a session	Integer	12345
created_at	When the session was started	Datetime	2013-01-01 12:00:00
user_id	Identifier for the user who started the session	Integer	101
is_repeat_session	Whether the user has had sessions before	Boolean	1
utm_source	UTM source for the session	String	gsearch
utm_campaign	UTM campaign for the session	String	bsearch
utm_content	UTM content for the session	String	sidebar_ad
device_type	Type of device used for the session	String	mobile
http_referer	The referer URL if there is one	String	https://www.example.com

DATABASE DESIGN - METADATA

WEBSITE_PAGEVIEWS

Attribute	Definition	Allowable Value	Example
website_pageview_id	Unique identifier for a pageview	Integer	56789
created_at	When the pageview occurred	Datetime	2013-01-01 12:05:00
website_session_id	Identifier for the session during which it occurred	Integer	12345
pageview_url	The URL of the page viewed	String	https://www.example.com/product/teddy_bear

DATABASE DESIGN - METADATA

ORDERS

Attribute	Definition	Allowable Value	Example
order_id	Unique identifier for an order	Integer	999
created_at	When the order was placed	Datetime	2013-01-01 12:30:00
website_session_id	Identifier for the session during which it occurred	Integer	12345
user_id	Identifier for the user who placed the order	Integer	101
primary_product_id	Identifier for the main product in the order	Integer	12345
items_purchased	Number of items in the order	Integer	3
price_usd	Total price of the order in USD	Float	49.99
cogs_usd	Cost of goods sold for the order in USD	Float	19.99

DATABASE DESIGN - METADATA

ORDER_ITEMS

Attribute	Definition	Allowable Value	Example
order_item_id	Unique identifier for an orderitem	Integer	99999
created_at	When the order item was added to the order	Datetime	2013-01-01 12:30:00
order_id	Identifier for the order it belongs to	Integer	999
product_id	Identifier for the product in theorder item	Integer	12345
is_primary_item	Whether it is the primary item inthe order	Boolean	1
price_usd	Price of the order item in USD	Float	49.99
cogs_usd	Cost of goods sold for the orderitem in USD	Float	19.99

DATABASE DESIGN - METADATA

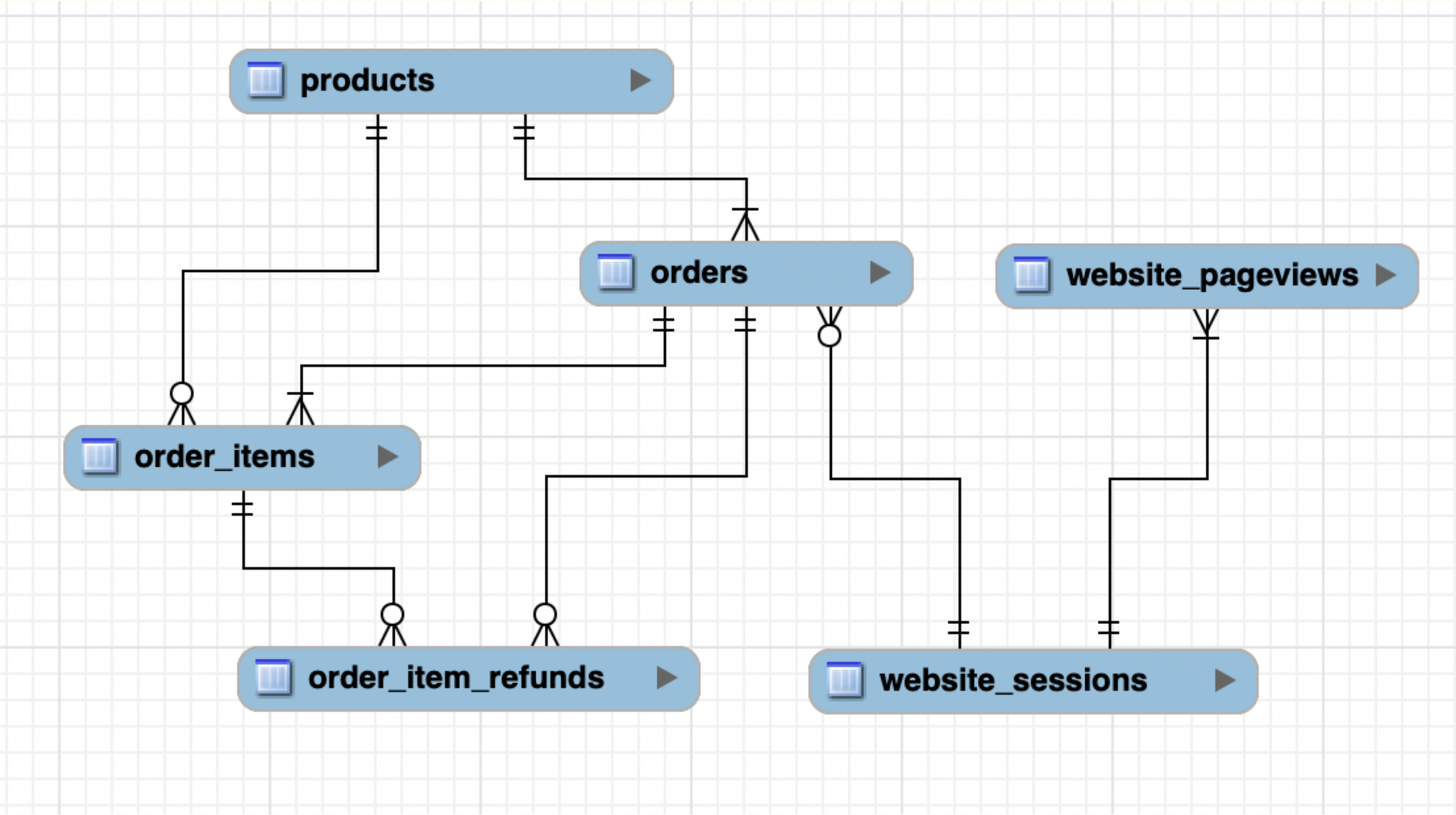
ORDER_ITEM_REFUNDS

Attribute	Definition	Allowable Value	Example
order_item_refund_id	Unique identifier for an orderitem refund	Integer	88888
created_at	When the refund was processed	Datetime	2013-01-0212:30:00
order_item_id	Identifier for the order item being refunded	Integer	99999
order_id	Identifier for the order being refunded	Integer	999
refund_amount_usd	Amount of the refund in USD	Float	19.99

DATABASE DESIGN - ENTITY RELATIONSHIP

PRODUCTS - ORDERS	• An ORDER can have one or more PRODUCTS • Any particular PRODUCT in an ORDER is itself one and only one product
PRODUCTS - ORDER_ITEMS	• A PRODUCT can be part of one or many ORDER ITEMS • An ORDER ITEM refers to one and only one PRODUCT.
ORDER - ORDER_ITEMS	• An ORDER can contain one or many ORDER ITEMS • Each ORDER ITEM belongs to one and only one ORDER
ORDER - ORDER_ITEM_REFUNDS	• An ORDER can have one or many REFUNDS • Each REFUND is associated with one and only one ORDER
ORDER_ITEM_REFUNDS - ORDER ITEMS	• Each REFUND corresponds to one and only one ORDER ITEM • An ORDER ITEM can have one or many REFUNDs associated with it (i.e. partial refunds)
ORDERS - WEBSITE SESSIONS	• Each ORDER is associated with one and only one WEBSITE SESSION • A WEBSITE SESSION can result in one or many ORDERS
WEBSITE SESSIONS - WEBSITE PAGEVIEWS	• Each WEBSITE SESSION can have one or many PAGEVIEWS • Each PAGEVIEW is associated with one and only one WEBSITE SESSION

DATABASE DESIGN - ERD



DATABASE DESIGN - BUSINESS RULES

Creating data:

- Products: When a new product is added, 'product_id' must be unique and 'product_name' cannot be null. The 'created_at' timestamp should be automatically generated to indicate when the product was added to the database.

- Website Sessions: A new session must be created whenever a 'user_id' visits the website, the 'created_at' timestamp should be automatically generated to indicate the start of the session.

- Orders: When an order is placed, 'order_id' and 'primary_product_id' must be provided. The 'created_at' timestamp should be automatically generated to indicate when the order was placed.

Updating data:

- Order Items: If the quantity or choice of products in an order changes before shipment, the 'order_items' records must be updated accordingly. If a primary product changes, the 'is_primary_item' flag needs to be updated.

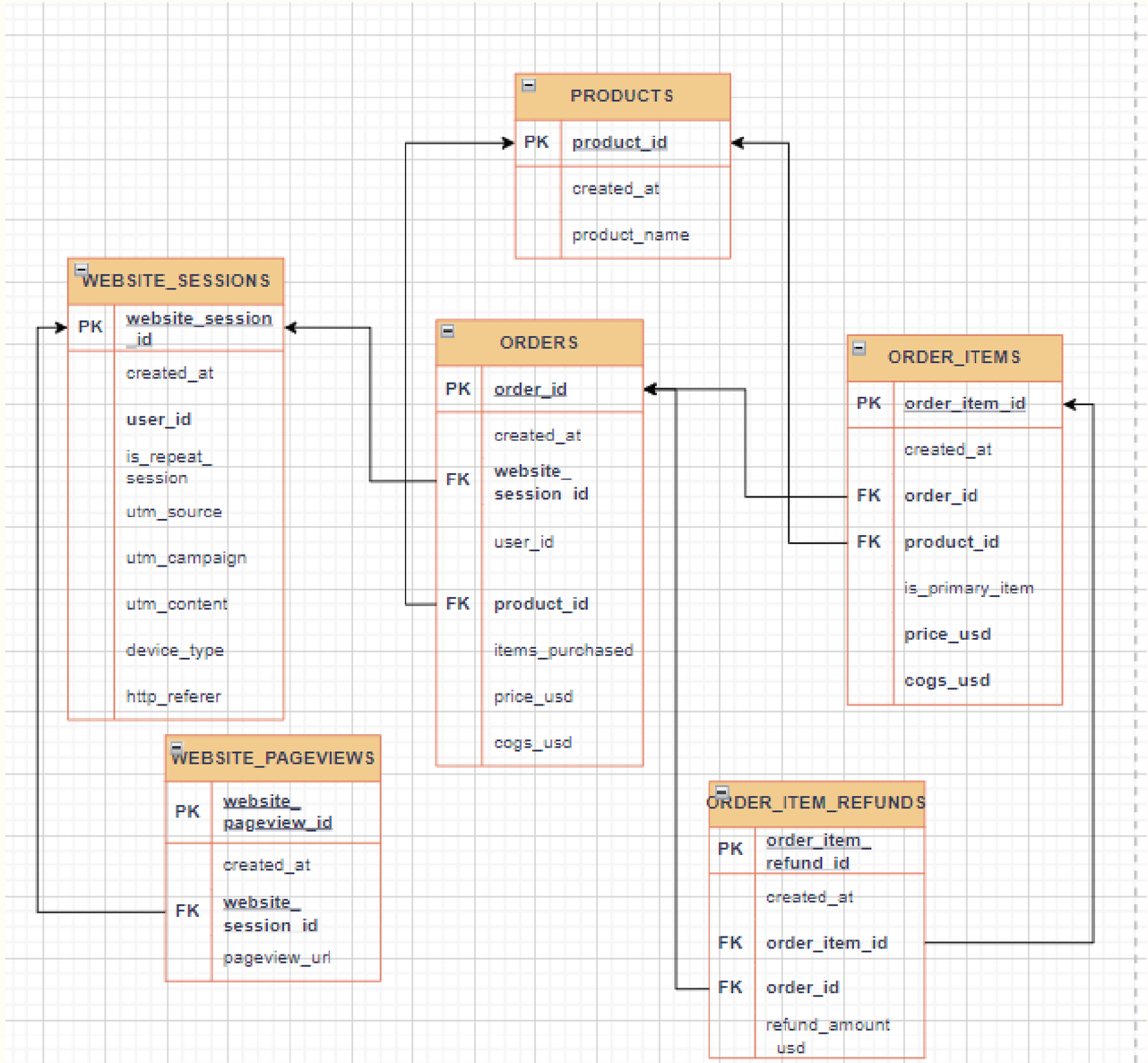
- Products: If product details like name are modified, the corresponding records must be updated. If a product is no longer available, a flag or status attribute (could be added) should be updated instead of deleting the record.

Deleting data:

- Order Item Refunds: When a refund is processed, a new 'order_item_refund' record should be created rather than deleting the 'order_item'. This ensures historical sales data integrity.

- Website Sessions: Sessions should not be deleted even if the user does not make a purchase to maintain accurate website traffic data.

DATABASE DESIGN - GRAPHICAL RELATIONAL SCHEMA



BUSINESS ANALYSIS - TOP SELLING PRODUCTS

```sql
#TOP Product Sold
SELECT p.product_name, SUM(oi.price_usd) AS product_sale
FROM order_items oi
INNER JOIN products p ON oi.product_id = p.product_id
GROUP BY p.product_name
ORDER BY product_sales DESC
LIMIT 4;
```

	product_name	product_sales
▶	Lovely Panda	1211057.74
	Chubby Bear	347702.04
	Furious Tiger	229260.15
	Sloppy Koala	150489.82

Insight

Identifying top sellers is essential for managers to guide inventory and marketing decsions.

We suggest that the company allocate more resources towards Lovely Panda, for example, increasing its inventory stock or investing more on product related advertising.

BUSINESS ANALYSIS - PRODUCT RETURN RATE

```sql
# Refund Rate
SELECT
    p.product_name,
    COUNT(DISTINCT oir.order_item_refund_id) / COUNT(DISTINCT oi.order_item_id) AS refund_rate
FROM
    products p
LEFT JOIN
    order_items oi ON p.product_id = oi.product_id
LEFT JOIN
    order_item_refunds oir ON oi.order_item_id = oir.order_item_id
GROUP BY
    p.product_id, p.product_name
ORDER BY
    refund_rate DESC
LIMIT 4;
```

product_name	refund_rate
Furious Tiger	0.0604
Lovely Panda	0.0511
Chubby Bear	0.0223
Sloppy Koala	0.0128

Insight

High refund rates may indicate product issues, prompting managers to review production, quality control, or online product descriptions.

The refund rate for 'Furious Tiger' is relatively higher than others, indicating a potential issue with customer satisfaction or product quality. The company should communicate with the product manufacturer to check on product quality.

BUSINESS ANALYSIS - CROSS-SELL ANALYSIS

```sql
SELECT DISTINCT
  LEAST(p1.product_name, p2.product_name)
  AS source_product,
  GREATEST(p1.product_name, p2.product_name)
  AS cross_sell_product,
  COUNT(DISTINCT o.order_id)
  AS cross_sell_count
FROM
  orders o
JOIN
  order_items oi1 ON o.order_id = oi1.order_id
JOIN
  products p1 ON oi1.product_id = p1.product_id
JOIN
  order_items oi2 ON oi1.order_id = oi2.order_id
JOIN
  products p2 ON oi2.product_id = p2.product_id
WHERE
  p1.product_id <> p2.product_id
GROUP BY
  source_product,
  cross_sell_product
ORDER BY
  cross_sell_count DESC;
```

source_prod...	cross_sell_prod...	cross_sell_count
Lovely Panda	Sloppy Koala	3142
Furious Tiger	Lovely Panda	2036
Chubby Bear	Lovely Panda	944
Chubby Bear	Sloppy Koala	680
Furious Tiger	Sloppy Koala	662
Chubby Bear	Furious Tiger	248

Insight

Lovely Panda & Sloppy Koala and Furious Tiger & Lovely Panda appear to be the most popular bundle purchases.

The company can promote more bundle deals in regard to these two product combinations. Also the company can promote the companion products through personalized recommendation.

BUSINESS ANALYSIS - CONVERSION RATE BY LEADSOURCE

```sql
SELECT
  ws.utm_source,
  COUNT(DISTINCT o.order_id) AS total_conversions,
  COUNT(DISTINCT ws.website_session_id) AS total_visits,
  (COUNT(DISTINCT o.order_id) / COUNT(DISTINCT ws.website_session_id)) * 100 AS conversion_rate,
  (COUNT(DISTINCT o.order_id) / SUM(COUNT(DISTINCT o.order_id)) OVER ()) AS proportion
FROM
  website_sessions ws
LEFT JOIN
  orders o ON ws.website_session_id = o.website_session_id
GROUP BY
  ws.utm_source;
```

utm_source	total_conversions	total_visits	conversion_rate	proportion
NULL	6118	83328	7.3421	0.1893
bsearch	4519	62823	7.1932	0.1399
gsearch	21333	316035	6.7502	0.6602
socialbook	343	10685	3.2101	0.0106

Insight

Although bsearch has the highest conversion rate, this leadsource only accounts for 14% of total traffic.

On the other hand, gsearch's conversion rate ranks the second, but it accounts for more than half of the traffic.

The company should learn from the experience of users led by bsearch and focus on optimizing user conversion through gsearch.

BUSINESS ANALYSIS - AVERAGE VISIT BEFORE PURCHASE

```sql
# Average visits before purchase
SELECT AVG(count)
FROM (
    SELECT user_id, COUNT(*) AS count
    FROM website_sessions
    WHERE user_id IN (SELECT DISTINCT user_id FROM orders)
    GROUP BY user_id) AS t;
```

	AVG(count)
▶	1.5137

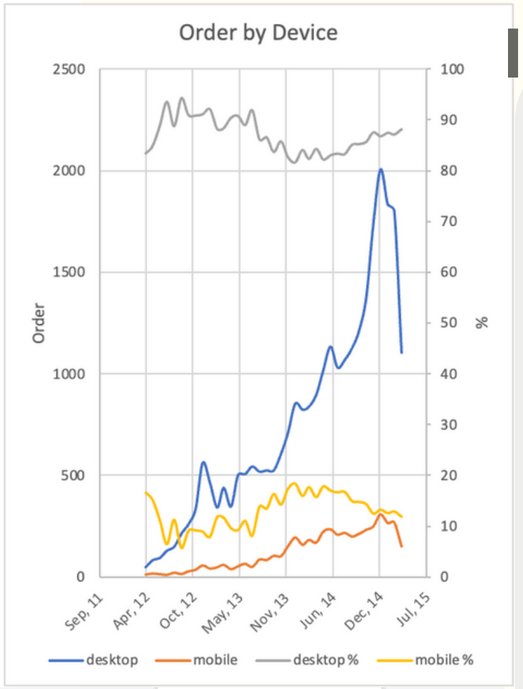
Insight

An average visit before purchase > 1 could mean that customers visit the website and bounce to other websites for product/price comparison.

Our recommendation is to optimize the CTA (call-to-action). One example could be offering best price guarantee if purchase today.

BUSINESS ANALYSIS - SALES BY DEVICE TYPE

```sql
SELECT
    t.month, t.device_type, t.order_count,
    (t.order_count / t2.total_orders) * 100 AS order_percentage
FROM
(
    SELECT
        DATE_FORMAT(o.created_at, '%Y-%m') AS month,
        ws.device_type,
        COUNT(DISTINCT o.order_id) as order_count
    FROM orders o
    JOIN website_sessions ws ON o.website_session_id = ws.website_session_id
    GROUP BY month, ws.device_type
) AS t
JOIN
(
    SELECT
        DATE_FORMAT(created_at, '%Y-%m') AS month,
        COUNT(DISTINCT order_id) AS total_orders
    FROM orders
    GROUP BY month
) AS t2
ON t.month = t2.month
ORDER BY t.month DESC, order_percentage DESC;
```



month	device_type	order_count	order_percentage
2015-03	desktop	1105	88.1180
2015-03	mobile	149	11.8820
2015-02	desktop	1801	87.0890
2015-02	mobile	267	12.9110
2015-01	desktop	1834	87.4166
.....			
2012-04	desktop	84	84.8485
2012-04	mobile	15	15.1515
2012-03	desktop	50	83.3333
2012-03	mobile	10	16.6667

Insight

Based on the percentage allocation over time, it was found that the percentage of desktop traffic has been slightly increasing. However, the total absolute values of traffic from both channels have decreased in recent years, suggesting that the website is not doing well.

Depending on where the traffic loss is coming from (ads/organic), the company can then decide where to focus on customer acquisition.

SCOPE EXTENSION

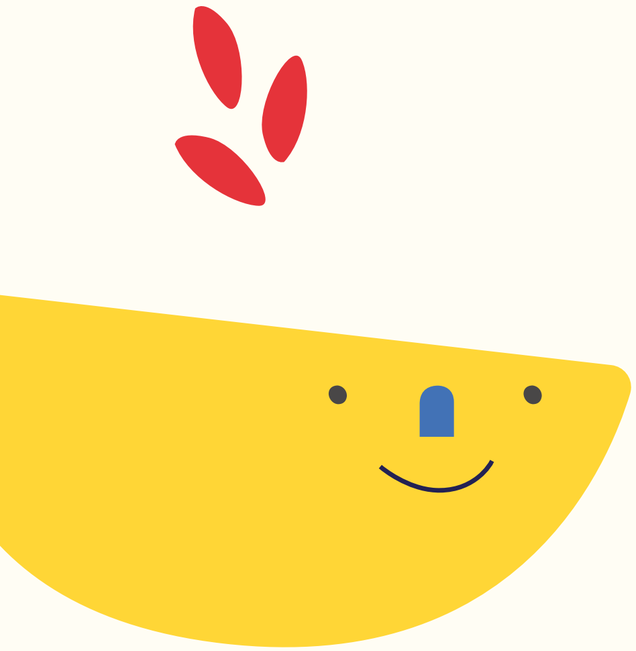
Additional entities:

- When our business grows bigger, we could encourage customers to sign up as members and create a **CUSTOMER** entity to track customer profiles for personalized marketing opportunities
- If we decide to transfer the manufacturing and shipping functions in-house, an **INVENTORY** entity would be helpful in tracking inventory levels

Additional analysis:

- Run an analysis around the **marginal contribution** of products to understand their profitability and help decision-making in terms of product pricing
- Run an analysis around the utm campaigns to determine the **effectiveness of the campaign** across different platforms
- Run an analysis around website sessions, particularly to analyze **cross-device activities** (mobile-to-desktop, or desktop-to-mobile) to optimize cross-device user journey
- Run an analysis around the **http-referer** to understand who drives the most of our website traffic and help decision-making in terms of ads spending resource allocation

THANK YOU!



APPENDICES

Order_item_refund

order_item_refund_id	created_at	order_item_id	order_id	refund_amount_usd
1	2012-04-06 11:32:43	57	57	49.99
2	2012-04-13 01:09:43	74	74	49.99
3	2012-04-15 07:03:48	71	71	49.99
4	2012-04-17 20:00:37	118	118	49.99
5	2012-04-22 20:53:49	116	116	49.99
6	2012-05-04 11:59:07	147	147	49.99
7	2012-05-12 02:41:14	186	186	49.99
8	2012-05-16 13:06:01	191	191	49.99

Order_item

order_item_id	created_at	order_id	product_id	is_primary_item	price_usd	cogs_usd
1	2012-03-19 10:42:46	1	1	1	49.99	19.49
2	2012-03-19 19:27:37	2	1	1	49.99	19.49
3	2012-03-20 06:44:45	3	1	1	49.99	19.49
4	2012-03-20 09:41:45	4	1	1	49.99	19.49
5	2012-03-20 11:28:15	5	1	1	49.99	19.49
6	2012-03-20 16:12:47	6	1	1	49.99	19.49
7	2012-03-20 17:03:41	7	1	1	49.99	19.49
8	2012-03-20 23:35:27	8	1	1	49.99	19.49

Orders

order_id	created_at	website_session_id	user_id	primary_product_id	items_purchased	price_usd	cogs_usd
1	2012-03-19 10:42:46	20	20	1	1	49.99	19.49
2	2012-03-19 19:27:37	104	104	1	1	49.99	19.49
3	2012-03-20 06:44:45	147	147	1	1	49.99	19.49
4	2012-03-20 09:41:45	160	160	1	1	49.99	19.49
5	2012-03-20 11:28:15	177	177	1	1	49.99	19.49
6	2012-03-20 16:12:47	232	232	1	1	49.99	19.49
7	2012-03-20 17:03:41	241	241	1	1	49.99	19.49
8	2012-03-20 23:35:27	295	295	1	1	49.99	19.49

Products

product_id	created_at	product_name
1	2012-03-19 08:00:00	Lovely Panda
2	2013-01-06 13:00:00	Chubby Bear
3	2013-12-12 09:00:00	Furious Tiger
4	2014-02-05 10:00:00	Sloppy Koala
NULL	NULL	NULL

Web_pageviews

website_pageview_id	created_at	website_session_id	pageview_url
1	2012-03-19 08:04:16	1	/home
2	2012-03-19 08:16:49	2	/home
3	2012-03-19 08:26:55	3	/home
4	2012-03-19 08:37:33	4	/home
5	2012-03-19 09:00:55	5	/home
6	2012-03-19 09:05:46	6	/home
7	2012-03-19 09:06:27	7	/home
8	2012-03-19 09:10:08	6	/products

Web_sessions

website_session_id	created_at	user_id	is_repeat_session	utm_source	utm_campaign	utm_content	device_type	http_referer
40	2012-03-19 12:45:10	40	0	gsearch	nonbrand	g_ad_1	desktop	https://www.gsearch.com
41	2012-03-19 12:55:38	41	0	gsearch	nonbrand	g_ad_1	desktop	https://www.gsearch.com
42	2012-03-19 12:55:57	42	0	gsearch	nonbrand	g_ad_1	desktop	https://www.gsearch.com
43	2012-03-19 12:57:35	43	0	gsearch	nonbrand	g_ad_1	mobile	https://www.gsearch.com
44	2012-03-19 13:10:20	44	0	gsearch	nonbrand	g_ad_1	desktop	https://www.gsearch.com
45	2012-03-19 13:11:43	45	0	gsearch	nonbrand	g_ad_1	desktop	https://www.gsearch.com
46	2012-03-19 13:14:49	46	0	gsearch	nonbrand	g_ad_1	mobile	https://www.gsearch.com
47	2012-03-19 13:19:35	47	0	gsearch	nonbrand	g_ad_1	desktop	https://www.gsearch.com