Ecommerce Model: Amazon

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Business Model of Amazon

- Amazon is an online marketplace, cloud computing platform, and digital streaming service.
- It operates through various segments including retail, subscriptions, and third-party seller services.
- Revenue streams include product sales, Amazon Prime memberships, advertising, and AWS (Amazon Web Services).
- For our project, we decided to focus only on their famous and successful Ecommerce.

Application Components and Processes (1/2)

1. **Users**
   - **Customers:** Interact with the site to search, evaluate, and purchase products.
   - **Sellers:** Offer products on the platform.
2. **Shopping Cart System**
   - **User Interaction:** Allows users to add products and view their selection before proceeding to checkout.
3. **Payment System**
   - **Payment Method Interaction:** Communicates with various payment gateways (such as credit cards, PayPal) to process transactions.
4. **Order Management**
   - Allows users to track the status of their orders.

Application Components and Processes (2/2)

5. **Recommendation System**
   - Offers product recommendations based on the user's browsing and purchase history.
6. **Review and Rating System**
   - Allows users to leave comments and ratings on products, influencing the purchasing decisions of others.
7. **Logistics and Shipping**
   - Ensures that products are available and coordinates shipping.
8. **Promotions**
   - Encourages customer loyalty through discounts or coupons.

Steps to Develop the Entity-Relationship Model: Define Components

- **Define Components:**
  - The components for Amazon's E-commerce platform include users (customers, sellers), products, categories, orders, and reviews.
  - Additionally, it covers shopping carts, payment methods, shipping details, and promotions.
- These components are essential for defining how data is structured and flows through the application.

Steps to Develop the Entity-Relationship Model: Define Entities

- **Define Entities:**
  - Customer (Usuario)
  - Product (Producto)
  - Category (Categoría de Producto)
  - Order (Pedido)
  - ShoppingCart (Carrito de Compras)
  - PaymentMethod (Método de Pago)
  - Review (Reseña)
  - Shipping (Envío)
  - Offer (Oferta)
  - Seller (Vendedor)
  - SearchHistory (Historial de Búsquedas)
  - ProductRecommendations (Recomendaciones de Productos)
  - Returns (Devoluciones)
  - Coupons (Cupones)
- Defining entities helps organize data into meaningful groups.

Define Attributes: Customer and Product

- Each entity is associated with attributes that define its characteristics. Key attributes for each entity include:
  Customer:
  - User ID (PK), Full Name, Email, Shipping Address, Phone, Registration Date

  Product:
  - Product ID (PK), Product Name, Description, Price, Quantity Available,
  - Category ID (FK), Shopping Cart ID (FK), Seller ID (FK)

Define Attributes: Customer, Product, Category, Order

Customer: User ID (PK), Full Name, Email, Shipping Address, Phone, Registration Date
Product: Product ID (PK), Product Name, Description, Price, Quantity Available, Category ID (FK), Shopping Cart ID (FK), Seller ID (FK)
Category: Category ID (PK), Category Name, Description
Order: Order ID (PK), Order Date, Customer ID (FK), Total Amount, Order Status, Payment Method ID (FK), Shipping ID (FK)

Steps to Develop the Entity-Relationship Model:Define Attributes

Shopping Cart: Cart ID (PK), Customer ID (FK)
Payment Method: Payment Method ID (PK), Payment Type, Customer ID (FK)
Review: Review ID (PK), Rating, Comment, Review Date, Customer ID (FK), Product ID (FK)
Shipping: Shipping ID (PK), Shipping Company, Shipping Date, Estimated Delivery Date, Shipping Cost
Offer: Offer ID (PK), Discount, Start Date, End Date, Product ID (FK)

Steps to Develop the Entity-Relationship Model:Define Attributes

Seller: Seller ID (PK), Seller Name, Seller Type, Seller Rating
Search History: Search ID (PK), Search Term, Search Date, Customer ID (FK)
Product Recommendations: Recommendation ID (PK), Customer ID (FK), Recommended Product ID (FK)
Returns: Return ID (PK), Return Date, Return Reason, Return Status, Order ID (FK)
Coupons: Coupon ID (PK), Discount Code, Discount Value, Expiration Date, Applicable Product ID (FK)

Steps to Develop the Entity-Relationship Model: Define Relationships

The following table shows the relationships that the entities have with each other so we can then see what type they are related to.

	Customer	Product	Category	Order	ShoppingCart	PaymentMethod	Review	Shipping	Offer	Seller	SearchHistory	ProductRecommendations	Returns	Coupons
Customer	X			✓	✓	✓	✓				✓	✓		
Product		X	✓				✓		✓	✓				✓
Category			X											
Order	✓			X				✓					✓	
ShoppingCart	✓				X									
PaymentMethod	✓					X								
Review	✓	✓					X							
Shipping				✓				X						
Offer		✓							X					
Seller		✓								X				
SearchHistory	✓										X			
ProductRecommendations	✓	✓										X		
Returns				✓									X	
Coupons		✓												X

Figure: Entity Relationship Table

Steps to Develop the Entity-Relationship Model: Define Relationship Types

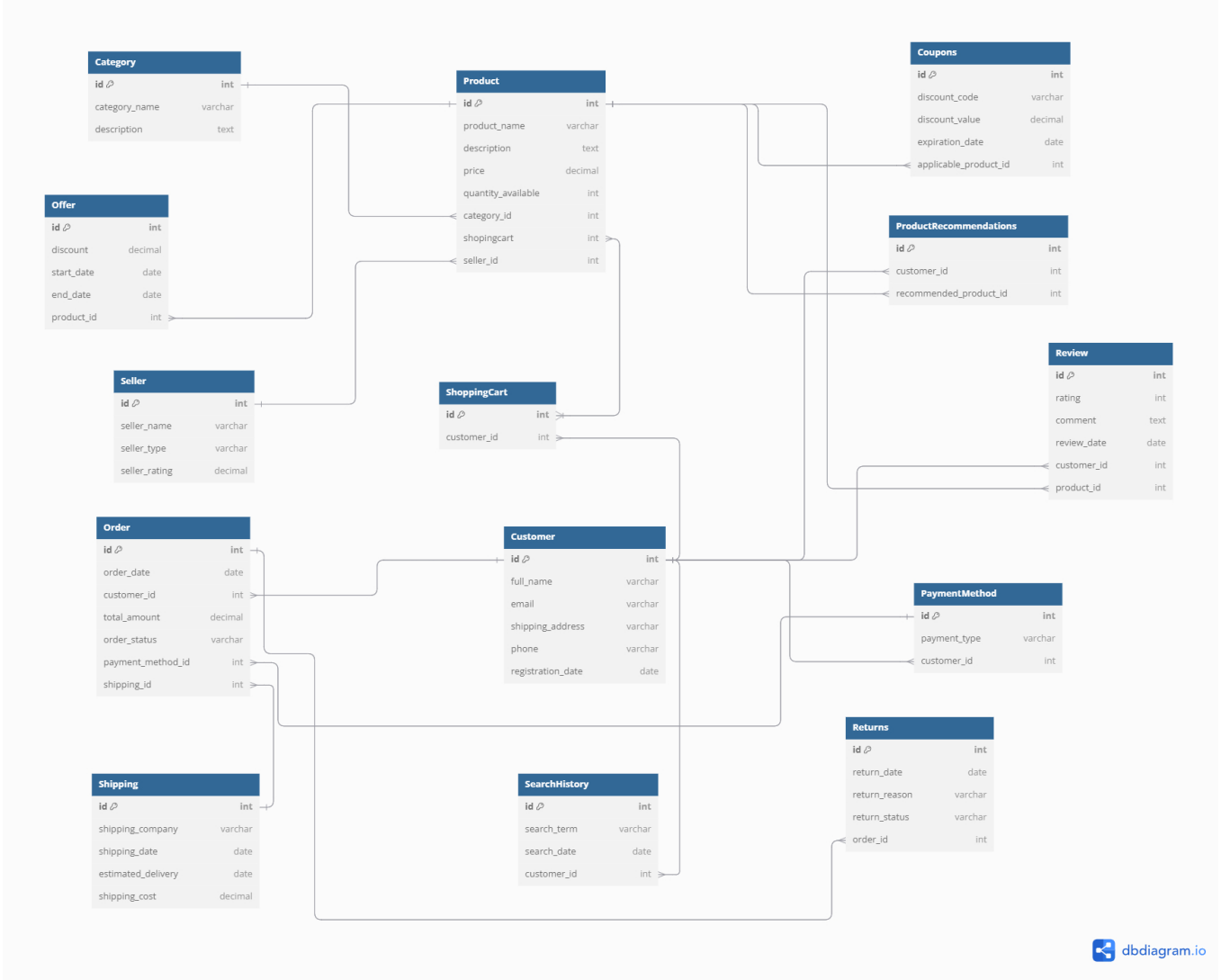
- **Define Relationship Types:**
  - Define whether relationships are one-to-one, one-to-many, or many-to-many.

Relationship	Type
Customer - order	1 to many
Customer - ShoppingCart	1 to 1
Customer - PaymentMethod	1 to many
Customer - Review	1 to many
Customer - SearchHistory	1 to many
Customer - ProductRecomendations	1 to many
Product - Category	Many to 1
Product - ShopingCart_Product	Many to many
Product - Review	1 to many
Product - Ofter	1 to many
Product - Cupons	1 to many
Seller - Product	1 to many
Order - PaymentMethod	1 to 1
Order - Shipping	1 to 1
Order - Returns	1 to many

Figure: Entity Relationship Table

- Understanding relationship types is crucial for optimizing database structure.

Steps to Develop the Entity-Relationship Model: First ER Diagram

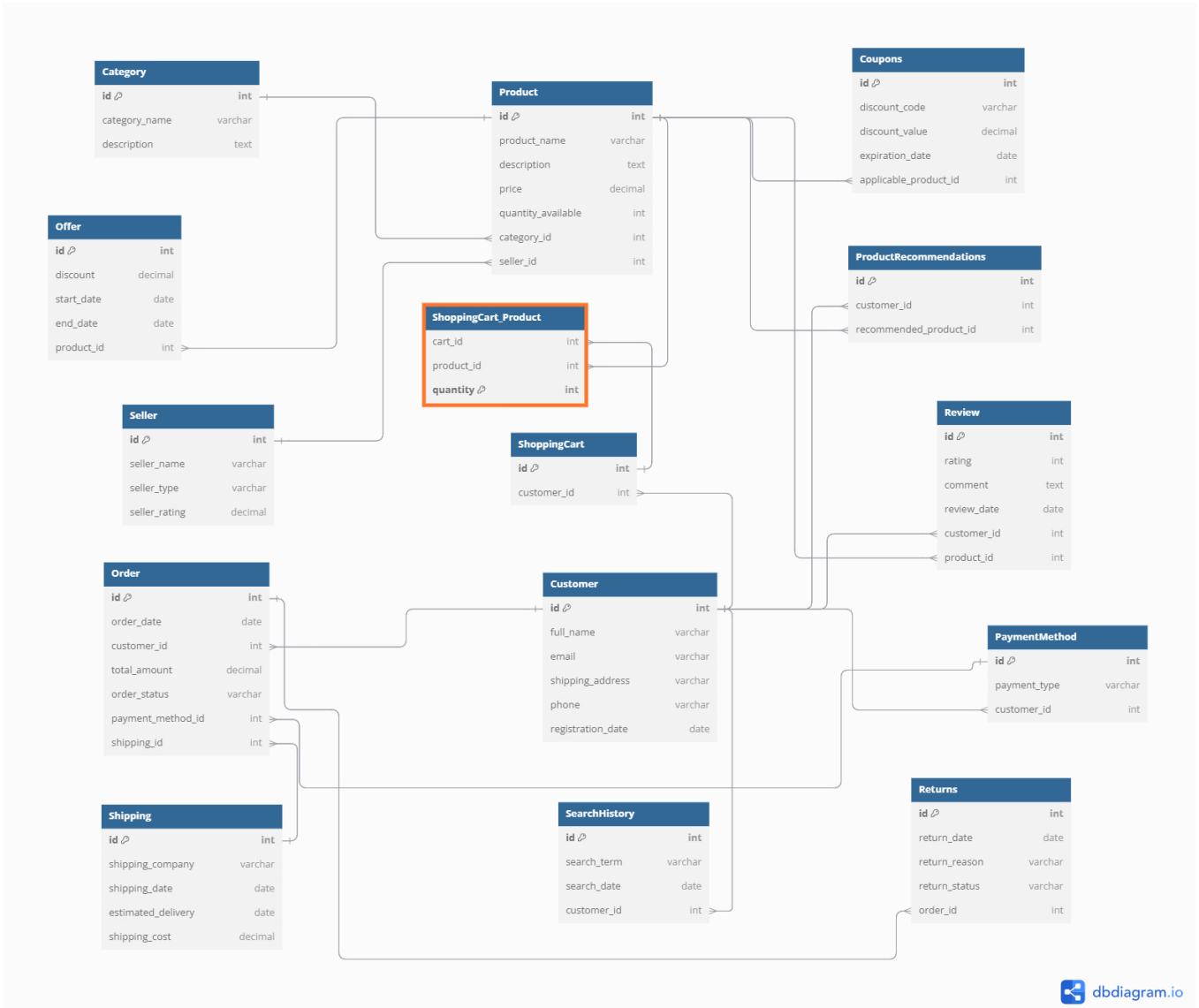


Steps to Develop the Entity-Relationship Model: Resolve Many-to-Many

Within our first design (DER), we find that between the entities "Products" and "ShoppingCart" there is a many-to-many relationship since a shopping cart can contain many products and a product can be in many carts. We must eliminate this relationship since it can generate problems in the queries. That is why we implemented a new entity called "ShoppingCart_Product" with the following attributes:

- **cart_id**: A foreign key referencing the ShoppingCart entity to identify which shopping cart the product belongs to.
- **product_id**: A foreign key referencing the Product entity to identify which product is being added to the shopping cart.
- **quantity**: An integer attribute indicating the number of units of the product that the customer wants to purchase.

Steps to Develop the Entity-Relationship Model: Second ER Diagram



Steps to Develop the Entity-Relationship Model: Data Structure

Entity	Attribute	Data Type
Customer	id	int
	full_name	varchar
	email	varchar
	shipping_address	varchar
	phone	varchar
	registration_date	date

Product	id	int	PK, Auto Increment
	product_name	varchar	NOT NULL
	description	text	
	price	decimal	NOT NULL
	quantity_available	int	NOT NULL
	category_id	int	FK (Category.id)
	seller_id	int	FK (Seller.id)

Category	id	int	PK, Auto Increment
	category_name	varchar	NOT NULL
	description	text	

ShoppingCart	id	int	PK, Auto Increment
	customer_id	int	FK (Customer.id)

Steps to Develop the Entity-Relationship Model: Data Structure

ShoppingCart_Product	cart_id	int	FK (ShoppingCart.id)
	product_id	int	FK (Product.id)
	quantity	int	

PaymentMethod	id	int	PK, Auto Increment
	payment_type	varchar	NOT NULL
	customer_id	int	FK (Customer.id)

Review	id	int	PK, Auto Increment
	rating	int	NOT NULL
	comment	text	
	review_date	date	NOT NULL
	customer_id	int	FK (Customer.id)
	product_id	int	FK (Product.id)

Shipping	id	int	PK, Auto Increment
	shipping_company	varchar	NOT NULL
	shipping_date	date	
	estimated_delivery	date	
	shipping_cost	decimal	

Steps to Develop the Entity-Relationship Model: Data Structure

SearchHistory	id	int	PK, Auto Increment
	search_term	varchar	NOT NULL
	search_date	date	NOT NULL
	customer_id	int	FK (Customer.id)

ProductRecommendations	id	int	PK, Auto Increment
	customer_id	int	FK (Customer.id)
	commended_product_	int	FK (Product.id)

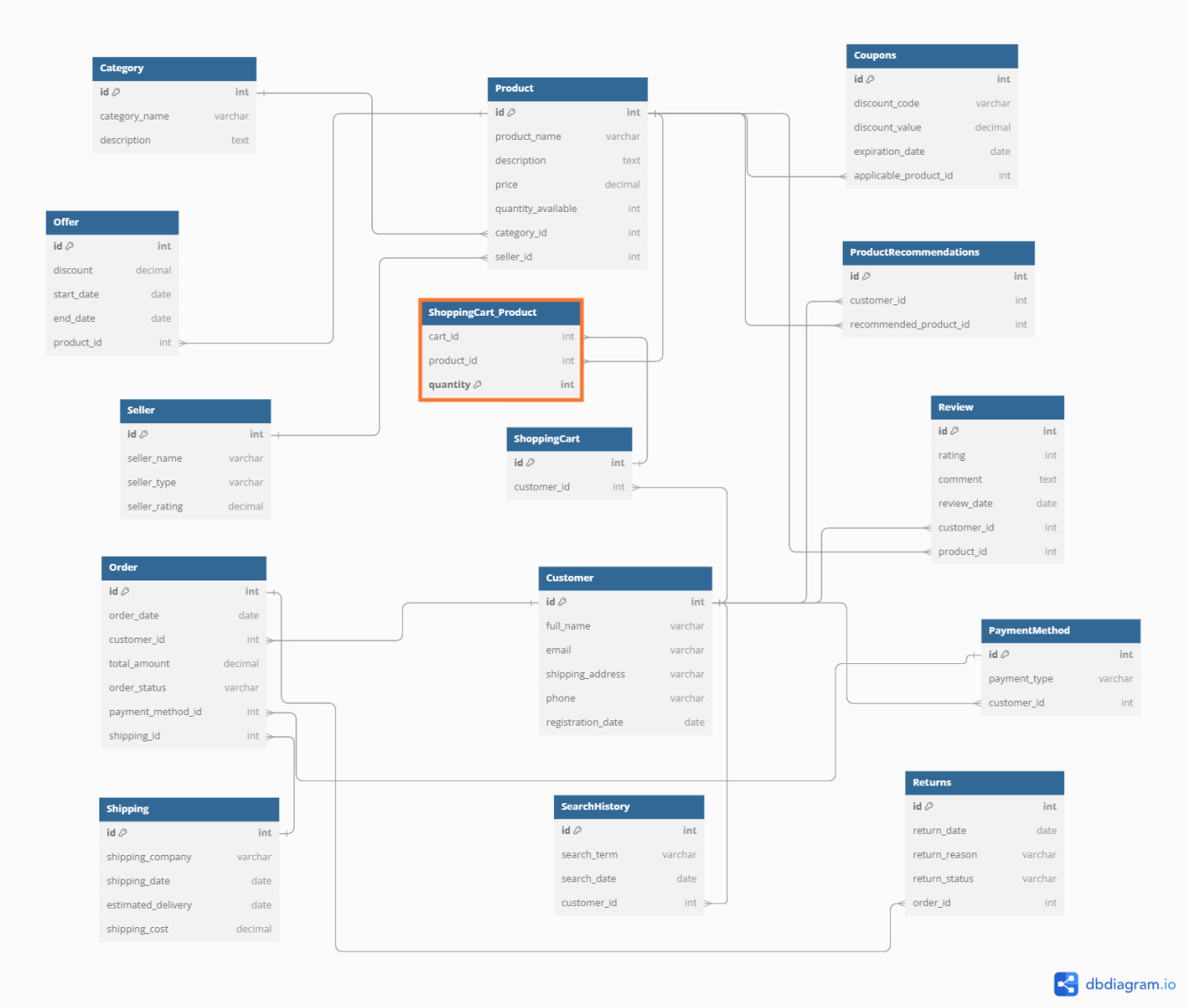
Returns	id	int	PK, Auto Increment
	return_date	date	NOT NULL
	return_reason	varchar	
	return_status	varchar	
	order_id	int	FK (Order.id)

Coupons	id	int	PK, Auto Increment
	discount_code	varchar	NOT NULL
	discount_value	decimal	NOT NULL
	expiration_date	date	NOT NULL
	applicable_product_id	int	FK (Product.id)

Steps to Develop the Entity-Relationship Model: Constraints and Properties

Entity	Attribute	Data Type	Constraints
Customer	id	int	PK, Auto Increment
	full_name	varchar(255)	NOT NULL
	email	varchar(255)	NOT NULL, UNIQUE
	shipping_address	varchar(500)	NOT NULL
	phone	varchar(15)	NOT NULL
	registration_date	date	NOT NULL
Product	id	int	PK, Auto Increment
	product_name	varchar(255)	NOT NULL
	description	text	
	price	decimal(10, 2)	NOT NULL
	quantity_available	int	NOT NULL
	category_id	int	FK (Category.id)
	seller_id	int	FK (Seller.id)
Category	id	int	PK, Auto Increment
	category_name	varchar(255)	NOT NULL
	description	text	
Order	id	int	PK, Auto Increment
	order_date	date	NOT NULL
	customer_id	int	FK (Customer.id)
	total_amount	decimal(10, 2)	NOT NULL
	order_status	varchar(50)	NOT NULL
	payment_method_id	int	FK (PaymentMethod.id)
	shipping_id	int	FK (Shipping.id)
ShoppingCart	id	int	PK, Auto Increment
	customer_id	int	FK (Customer.id)
ShoppingCart_Product	cart_id	int	FK (ShoppingCart.id)
	product_id	int	FK (Product.id)
	quantity	int	
PaymentMethod	id	int	PK, Auto Increment
	payment_type	varchar(50)	NOT NULL
	customer_id	int	FK (Customer.id)
Review	id	int	PK, Auto Increment
	rating	int	NOT NULL
	comment	text	
	review_date	date	NOT NULL
	customer_id	int	FK (Customer.id)
	product_id	int	FK (Product.id)
Shipping	id	int	PK, Auto Increment
	shipping_company	varchar(255)	NOT NULL
	shipping_date	date	
	estimated_delivery	date	
	shipping_cost	decimal(10, 2)	
Offer	id	int	PK, Auto Increment
	discount	decimal(10, 2)	NOT NULL
	start_date	date	NOT NULL
	end_date	date	NOT NULL
	product_id	int	FK (Product.id)
Seller	id	int	PK, Auto Increment
	seller_name	varchar(255)	NOT NULL
	seller_type	varchar(50)	
	seller_rating	decimal(3, 2)	
SearchHistory	id	int	PK, Auto Increment
	search_term	varchar(255)	NOT NULL
	search_date	date	NOT NULL
	customer_id	int	FK (Customer.id)
ProductRecommendations	id	int	PK, Auto Increment
	customer_id	int	FK (Customer.id)
	commended_product_	int	FK (Product.id)
Returns	id	int	PK, Auto Increment
	return_date	date	NOT NULL
	return_reason	varchar(255)	
	return_status	varchar(50)	
	order_id	int	FK (Order.id)
Coupons	id	int	PK, Auto Increment
	discount_code	varchar(50)	NOT NULL
	discount_value	decimal(10, 2)	NOT NULL
	expiration_date	date	NOT NULL
	applicable_product_id	int	FK (Product.id)

Final Entity-Relationship Model



Conclusion

- The Amazon ecommerce model integrates various processes for seamless user experience.
- The defined ER model provides a robust framework for managing data interactions.
- Future enhancements can be made to adapt to changing market needs and technological advancements.

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