

# Thesis Research

## The Adoption of Next Generation Digital Printing Technologies in Package Printing

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# Agenda

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- 2 A Review of Literature in the Field
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- 5 Result
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# Introduction: Motivation & Statement of Problem

According to the Future of Digital Print for Packaging to 2018, it is expected that digital world market for digital packaging and labels will reach **\$15.3 billion** in 2018 (Smithers Pira, 2013).



Problem Statement: Which **package market segments** are **best suited** to **adopt next generation digital printing technologies** in the near future?





# A Review of Literature in the Field

- The researcher reviewed the literature to:
  - Understand how new technologies diffuse within existing markets.
  - Understand the factors that led the Pressure Sensitive label market to be best suited for initial penetration by digital printing technologies
  - Identify the potential packaging market segments which might be penetrated.
  - Understand the capability of next generation digital technologies versus the needs of target market segments



# Adoption and Diffusion of New Technology

The adoption of a new technology is the cumulative result of **weighing the incremental benefits** of adopting this technology against **the costs of the change** brought by it. (Hall and Khan, 2003)





# Factors Leading to PS Label Adoption

## Technology Readiness (HP Indigo ws4050)

- Format: equals narrow web flexo press width
- Image Quality: acceptable
- Substrate Compatibility: acceptable
- Speed: meets minimum requirements for short run labels

## Market Opportunity:

65% of all label jobs  $\leq$  2,000 m

80% of all label jobs  $\leq$  4,000 m

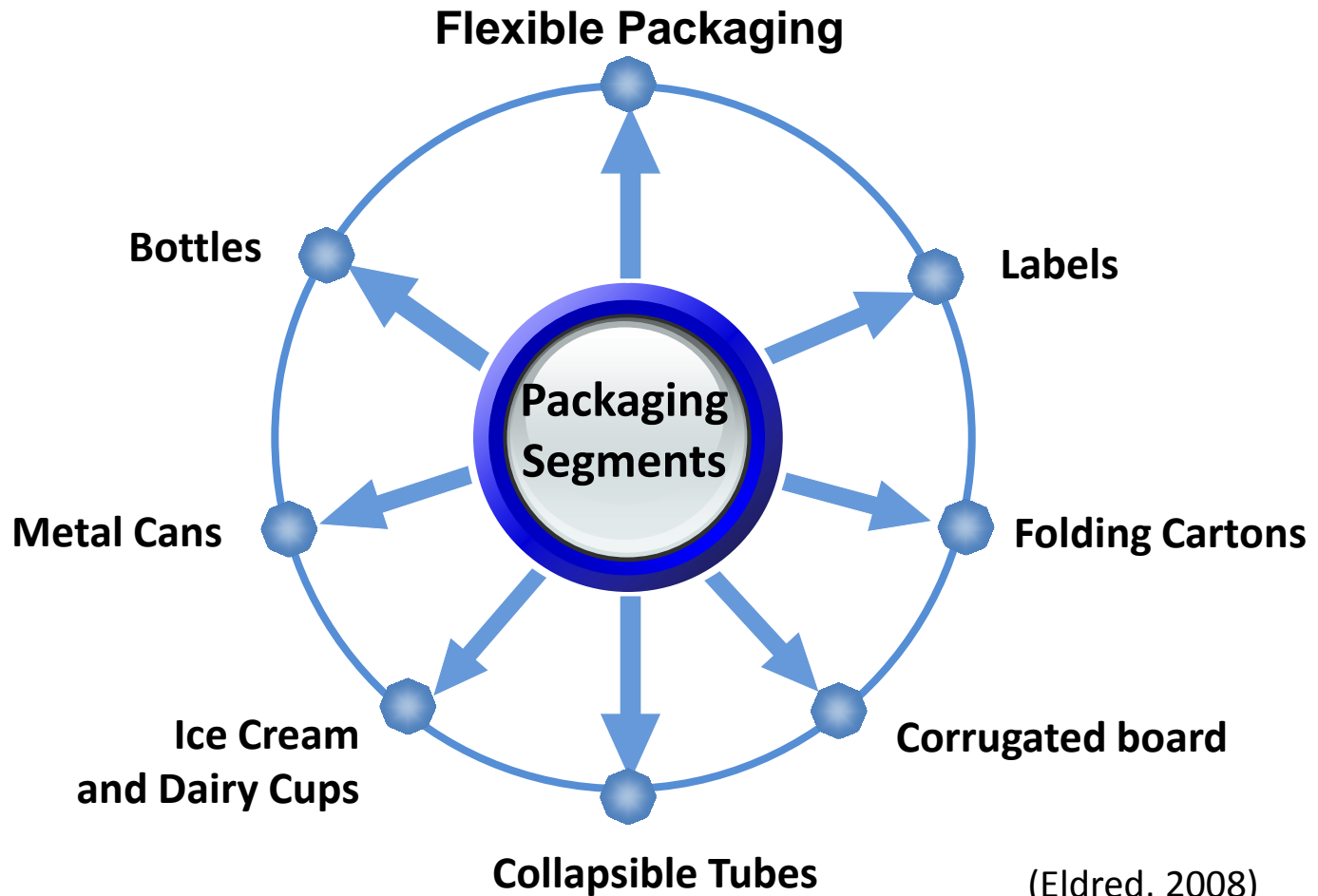
## Breakeven Run Length (Indigo vs. Flexo):

HP Indigo ws4050:  $\sim$ 2,000 m

HP Indigo ws6600:  $\sim$ 4,000 m





# Packaging Segmentation

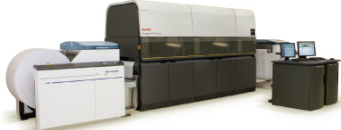



(Eldred, 2008)



# Next Generation Digital Printing Presses

	HP Indigo 30000	Landa S10
Sheetfed Presses		
Sheet Size	B2 - 29.5" x 20.9"	B1 - 41" x 29.5"
Max. Speed	3,450 sheets per hour (4 colors)	6,500 sheets per hour (8 colors)

	Kodak Prosper 6000	Landa W10
Web Presses		
Max. Width	24.45"	40.1"
Max. Speed	1,000 feet per minute	328 feet per minute

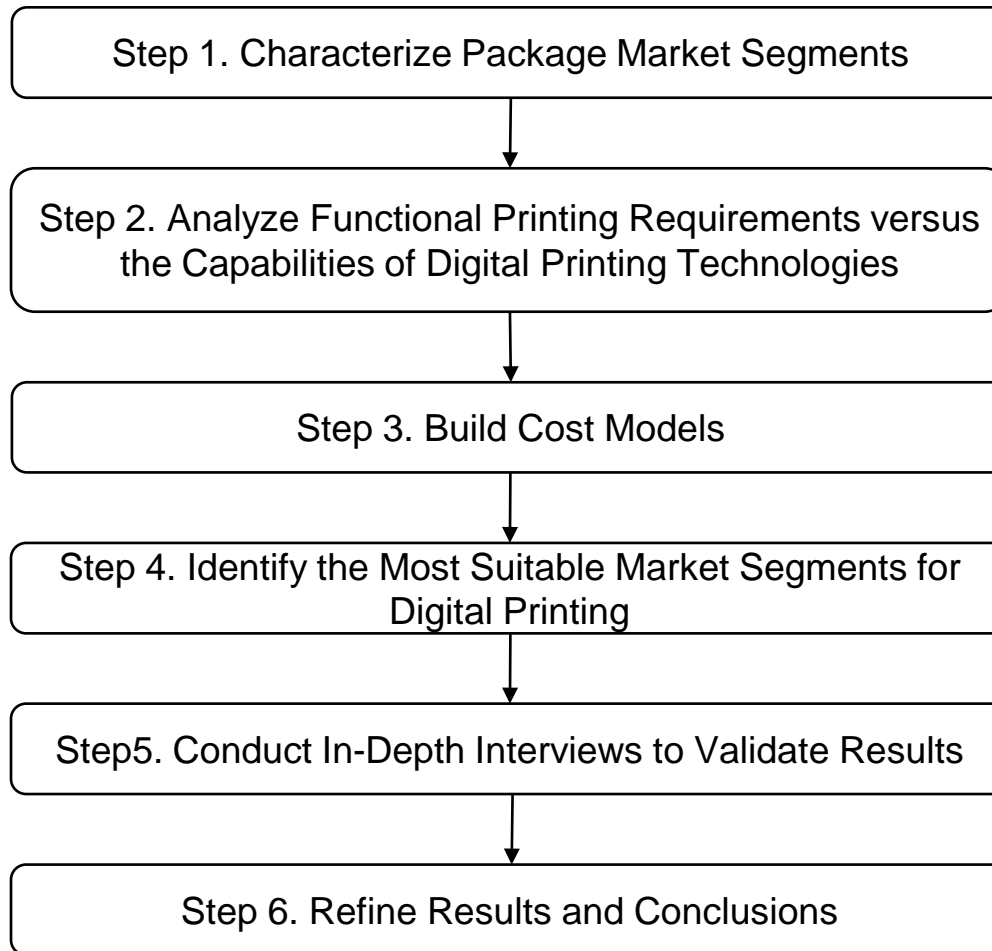


# Research Objectives

Determine which package market segments are best suited to adopt next generation digital printing technologies in the near future.



# Methodology



# Flexible Packaging Results

## Market Opportunity

- Large numbers of short run orders, especially for regional brands
- Short run  $\leq 14,000$  m<sup>2</sup>

## Technology Readiness

- No digital technology is fully ready to penetrate flexible packaging
- Kodak Stream technology is close (right speed, too narrow, paper only)
- A hypothetical Stream technology press was used for the cost models

## Result

- Breakeven run length for a hypothetical Stream press  $\approx 8,500$  m<sup>2</sup>
- Breakeven run length constrained by ink cost
- Research suspended in favor of the folding carton market



# Folding Carton Results – Short Run Opportunity

- Run length distribution:
  - Large carton supplier: 2% jobs  $\leq$  2,000 B1 sheets, 40% jobs  $\leq$  12,000 B1 sheets
  - Medium carton supplier: 15% jobs  $\leq$  2,000 B1 sheets, 70% jobs  $\leq$  12,000 B1 sheets
  - Regional carton supplier: 10% jobs  $\leq$  2,000 B1 sheets, 30% jobs  $\leq$  12,000 B1 sheets
- Companies all felt that jobs became uneconomic to run on B1 presses when run lengths dropped to **4,000 or 5,000** B1 sheets.





# Folding Cartons Results – Short Run Opportunity

Press	HP Indigo 30000	Landa S10
Crossover Run Length (B1 Sheets)	950 – 1,250 (CMYKOG + Spot) 1,600 – 2,100 (CMYKOG)	Currently: ~6,000 (CMYKOGV) Long Term Potential: 12,000 (CMYKOGV)

## Capability vs. Market Need:

- The HP Indigo 30000 addresses the under 2,000 sheet opportunity
- The Landa S10 addresses the 5,000 sheet opportunity now
- In the future, the Landa S10 has the potential to address all runs which are poor fits for sheetfed offset (runs up to 12,000 sheets long)



# Folding Carton Results – Promotional Opportunity

## Walmart

Application	Number of SKUs	Promotional SKUs Shelf Occupancy
Cereal	245	10.2%
Dental Care	240	10.1%
Crackers	215	11.4%
Soft Drink	94	14.9%



## Wegmans

Application	Number of SKUs	Promotional SKUs Shelf Occupancy
Cereal	206	4.0%
Dental Care	134	5.0%
Crackers	101	3.2%
Soft Drink	102	11.9%



# Folding Carton Results – Promotional Opportunity

- Because on-package promotion is widely used, there may be an opportunity to introduce new types of on-carton advertising that require digital printing to implement (e.g. localized promotions).
- Some folding carton suppliers stated that there are significant obstacles to implementing localized promotions (e.g. distribution chain limitations and difficulty in selling value).
- Other folding carton suppliers supported the localized promotional opportunity based on brand owner interest.

# Conclusion

The folding carton market was identified as the most suitable candidate for penetration by next generation digital presses because:

- Available technology meets the requirements of the folding carton market.
- The crossover run length creates a substantial opportunity for digital penetration.
- There may be potential for promotional packaging.





# Agenda for Further Research

- Investigate opportunities for reducing the cost of inkjet inks:
  - Develop a cost model for producing inkjet inks and explore ways to reduce the cost of making these inks as ink usage increases
  - Explore the impact of technologies that print thinner ink films
- Explore other technologies in flexible packaging
- Investigate the opportunity of localized promotion



# Thank you!