

AUTOMATING THE PRINT MANUFACTURING WORKFLOW

Solutions for the Content-First Newsroom

The background features a large, abstract graphic composed of a grid of small dots. The dots are arranged in a pattern that forms a series of overlapping, wavy shapes, creating a sense of depth and movement. The color of the dots transitions from a light blue on the left to a darker blue on the right, with some areas appearing as a vibrant cyan. The overall effect is a modern, digital aesthetic.

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1. INTRODUCTION

The Content-First Newsroom

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Spending too much time on designing printed editions is an obstacle to newsrooms' digital transformation.

1. INTRODUCTION

The Content-First Newsroom

The newspaper industry has faced massive disruption with the advent of the internet, mobile, and social media platforms. Many readers now get their news online, through apps, or in ePaper format—and newspapers are realizing that while print is a key source of revenue from both subscriptions and advertising, spending too much time on designing and managing printed editions is an obstacle to their digital transformation.

Technology has stepped up on the digital side, allowing papers to serve up content personalized to the subscriber and offering customer portals to boost subscriptions—but we can't say the same for the print side. Organizations are still having to manage and allocate resources toward task-heavy print processes instead of focusing on digitally transforming their business models.

In order to complete the move to digital, newsroom resources can no longer be tied to manual print manufacturing workflows. Publishers that can drive efficiencies at scale while reallocating resources from their print workflows to content generation will be able to evolve into “content first” organizations without having to focus on any particular channel—giving them the opportunity to create better content, speed up content production, and work on incorporating enrichments and metadata that will help attract and retain digital subscribers.

Not only that, streamlining the print process would allow publishers to support late-breaking news across any channel, since they can push out print deadlines.



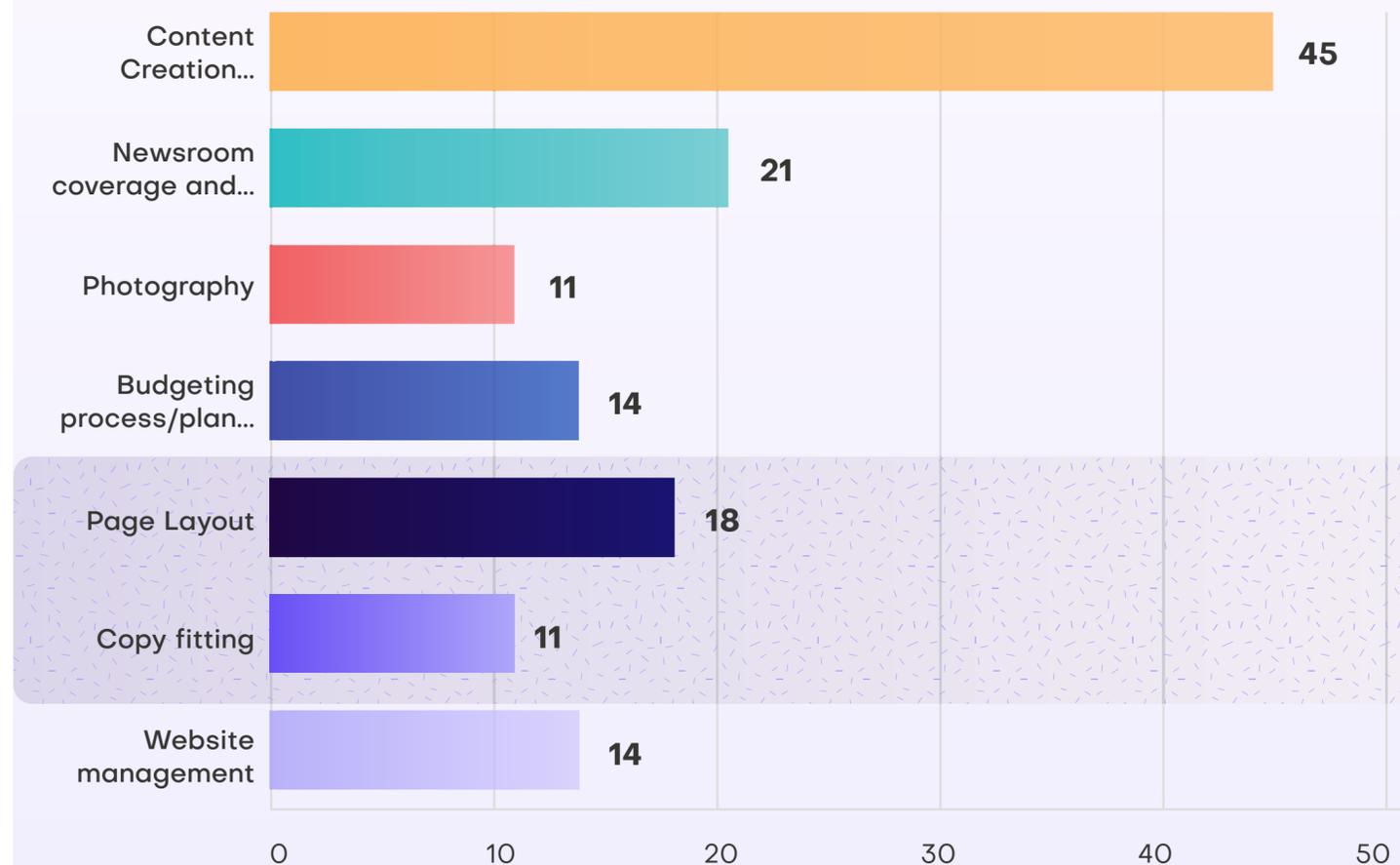
2. Artificial Intelligence and Machine Learning Take the Pressure Off Print

Purpose-built digital content tools for newsrooms have made the process for putting together digital content close to seamless. But the workflow for creating a print newspaper still involves expensive, time- and labor-intensive manual processes for analyzing articles, measuring copy, examining column lengths, editing content for length, placing content with ads that contextually make sense, and adjusting and readjusting the final design.

Right now, 22% of the total effort to deliver a newspaper is involved with manual page layout and copy fitting, and organizations with annual revenue over \$10m have an average of five subeditors (layout and copy) for print—according to a Print Production Process Survey conducted by Naviga in 2020.

Artificial Intelligence and Machine Learning solutions can bridge the gap, helping content flow automatically into the different formats for print, online, and mobile—using less time, money, and manpower.

Percentage of time your organization spends on the following activities:



22% of total effort to product a newspaper is involved with Page Layout and Copy Fitting

How Artificial Intelligence and Machine Learning Combine to Streamline the Publishing Process

ARTIFICIAL INTELLIGENCE

Artificial Intelligence (AI) systems perform behaviors associated with human intelligence, like planning, problem solving, or manipulation.

When Siri gives you directions to a restaurant, Amazon suggests a book you might like to read, or you get a text from your bank letting you know they detected fraud on your account—AI is at work.

In its broadest sense, if a machine is doing a task that a human has to apply intelligence to perform, that's Artificial Intelligence.

MACHINE LEARNING

Machine Learning (ML) is a subset of AI. An ML system is “trained” on human configurations and data. As the algorithms adapt to new data, they're able to learn through experience and eventually make predictions or decisions.

For example, some supermarkets are now using ML to enable touch-free self-checkout. Data engineers train the system with thousands of images of produce until it can recognize, say, an apple when a customer places one on a scale. The system becomes more and more accurate as more data is fed into it through real-world use.

HOW AI AND ML WORK IN PUBLISHING

The automation uses both human configurations and article metadata (news value, life span), metrics from digital channels (page visits, social sharing), and ePaper data (most-read articles, most-zoomed sections) to select and prioritize the content.

For print, the model can test out thousands of combinations of content, images, and graphical items on a print page to come up with the perfect fit.

With a solution that combines AI and ML, publishers can reapply existing headcount previously devoted to the print production workflow to more strategic areas of the business.



3. CASE STUDY:

Norwegian Newspaper Gets a “Make Me a Newspaper” Button

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Pat Stewart, VP of Development, Naviga

3. Case Study

Norwegian Newspaper Gets a “Make Me a Newspaper” Button

Agderposten, a daily newspaper published in Arendal, Norway, was using two different CMS platforms—one for print and one to convert the print content to digital. Reporters had to work in two “modes,” wasting time and energy.

“We didn’t want to do that anymore,” says Bjørn Robert Knudsen, Director of Technology at Agderposten. “We wanted to find a smooth way to make content available for the paper without having to spend a lot of labor in preparation.”

In March 2019, Knudsen told Agderposten’s print CMS provider, Naviga, that he wished they could make him a “make me a newspaper button.” Naviga was intrigued. Agderposten agreed to be a test subject for version 1.0 of a print automation solution, and a new project was launched.

Layouts Get Smarter

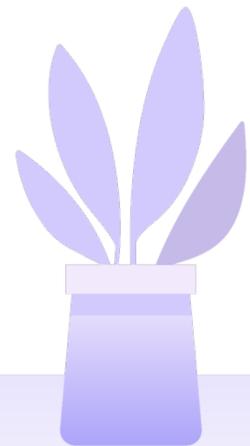
Naviga and Agderposten arranged a road trip for Naviga to visit and talk with a group of newspapers from all over Scandinavia. “What we heard from them loud and clear was that while it’s nice to have a great-looking print product, content is where they really drive their value now,” says Pat Stewart, VP of Development at Naviga. “The medium is no longer the message.” Another big takeaway was that papers in different countries handled print and digital production in different ways, so any new print automation product would need to be flexible.

As Naviga built the software, Agderposten served as “reviewers and sanity checkers,” says Stewart. “And of course we used their data and their publication, and they helped every step of the way,” he adds. “You could not build this software without the direct knowledge and consultation of a newsroom.”

Naviga interviewed layout editors and related staff members to learn how they currently work, trying to create an automated version of what the editors were making, so that they could compare the results side by side.

One challenge that arose during the software development was getting the automation to work effectively on the paper design as-is. “I tried to force the automation to work on the design that we already have, but in some cases it did not work out well,” says Øyvind Klausen, Director of Business Development at Polaris Media Sør. “So we made some tiny design changes. In the future we’ll also make some changes in our content and the way it’s presented in the printed newspaper for the automation to be more effective, because automating is so important for us. But we will not have to make any radical changes, or changes that will negatively affect our brand.”

Naviga Publisher and Sophi.io have enabled our news organization to develop the same level of quality newspaper with fewer resources. This enables us to re-allocate those resources to driving better content and increased subscriptions.



3. Case Study

Norwegian Newspaper Gets a “Make Me a Newspaper” Button

Stewart agrees that it’s important to keep any changes as minimal as possible, because a consistent brand look and feel is crucial for newspapers. “Newspapers have a brand presentation that’s subliminal,” he says. “How they do photos and how they style the content—all of that draws people to the paper.”

Pressing the “Print Button”

In June through October 2020, the last two months of development of the software, Klausen introduced the new solution, dubbed Naviga Publisher, which is powered by Sophio by The Globe and Mail and part of the Smart Layouts set of products. The newsroom spent two to three hours per day running the “print button”—preparing the stories and actually publishing selected pages.

The newsroom has been pleased with the results. “We’ve had very positive reactions from the newsroom so far,” says Klausen. “Everybody’s very hopeful for the future implications of what this can mean for us.”

Agderposten is the largest of its parent company’s eight newspapers, and the company plans to roll out Naviga Publisher on Agderposten first since that would make it easier to expand the solution to the other papers later—rather than starting small and having to add functionality as they scaled up. Agderposten has a partnership with another 15-20 newspapers, and hopes to bring them into Smart Layouts as well. “We also see the possibility of organizing a new sort of print desk that works with the automation across several newspapers,” Klausen says. “This



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could increase the effect that we gain from automation.”

When asked what advice he’d give to newspapers that are still manually laying out the print paper, Klausen says, “Implementing automation takes time and needs to be adjusted for each publication. So start scanning now, get this on your radar, and be realistic about how fast it can be implemented.”

4.

The Automated Workflow— from Draft to Printed Paper

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The Automated Workflow —from Draft to Printed Paper

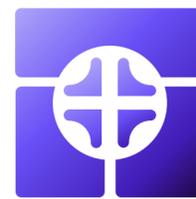
Putting together a newspaper is like putting together a huge jigsaw puzzle—except that the puzzle changes every day. With each edition, the editors have to decide how much space to give each piece of content and how prominent it will be.

Smart Layouts, the first solutions for automated layout, provide two tools that streamline this process:



Publisher

1. Naviga Publisher, which is powered by Sophi.io, an artificial intelligence system by The Globe and Mail, is a smart layout system that automates print manufacturing and ePaper publishing from a content-neutral content management system. Naviga Publisher has pre-configured data models and stylistic templates, making it ideal for managing an entire publication.



Templates

2. Naviga Templates, which automatically adjusts the layout elements and design variations so articles fit into the planned space without the need to edit the content. Any InDesign user can create templates, giving editors more control.



4.

The Automated Workflow —from Draft to Printed Paper

The Editor Selects and Prioritizes the Content

Smart Layouts allows journalists to write articles in a channel-agnostic way for print, digital, and mobile rather than worrying about writing to a length that will fit a certain number of column inches. The journalist can focus on writing a rich story that will attract readers, adding a teaser up top or going long on a particularly compelling story. The journalist can also work in all the keywords a



The content is truly king, and the editors are saved the hassle of editing down copy to fit.

reader might search, without having to leave any out for space considerations. Once the writers turn in their copy, the editors choose and prioritize the stories that will run in the printed edition.

The Editor Pushes the Newspaper Button

Once the editor presses that button, the AI model gets to work, testing out various layout possibilities and using natural language processing to determine article relationships which influence article placement.

Smart Layouts' Blockbuilder Calculates the Best Fits

To make all the content fit, and to ensure stories get the right amount of space depending on their prominence, Smart Layouts' Blockbuilder tool can automatically:

- ▶ Change the size of headlines.
- ▶ Add, remove, shrink, enlarge, or crop photos (using AI/ML smart cropping for photos from the Adobe InDesign tool suite).
- ▶ Test out running an article in, say, one long column versus spreading it across multiple short columns to change the shape of the story in a way that will fit. The software tests hundreds different shapes in this way.
- ▶ Add or remove stylistic items like fact boxes and quotes.

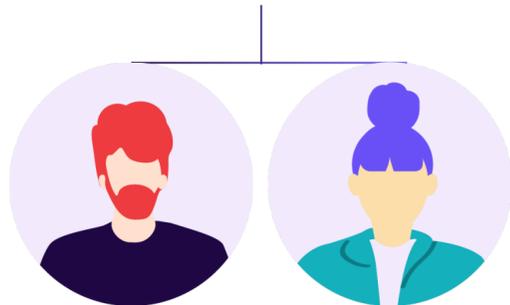
One thing the software does not do is change the story by adding or omitting words. The content is truly king, and the editors are saved the hassle of editing down copy to fit.

Five Steps to a Fully Automated Print Edition

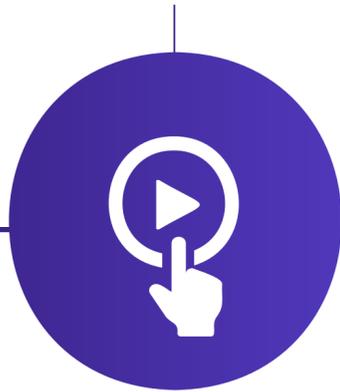
Naviga Content



Select articles for the Print edition.



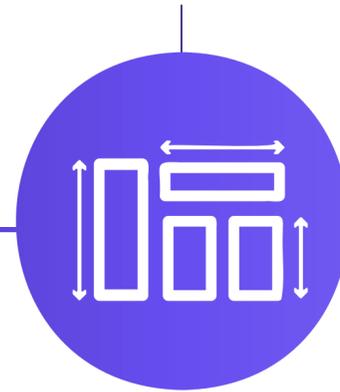
Naviga Publisher



Press the Newspaper button



Naviga Content



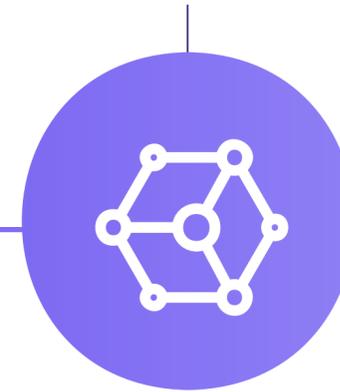
Blockbuilder will measure stories, total column length and headline alternatives

AI

+

ML

Sophi.io

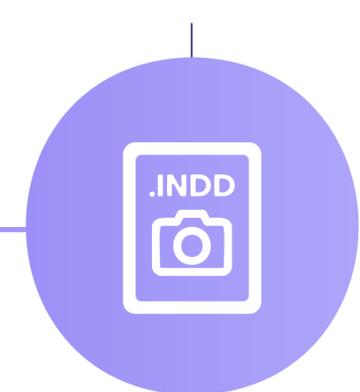


Blueprint engine will calculate and curate the layout of the newspaper



Sophi.io

Naviga Content



Pagebuilder creates camera ready papers delivered as InDesign files

4.

The Automated Workflow —from Draft to Printed Paper

How Much Time Does Automation Save?

The time savings that can be achieved depends on how much manual work the newsroom is doing and how much of that can be automated. For example, let's say your newsroom spends this percentage of time on each step:

1. Decide what content you want to run: 15%
2. Design the paper, including determining the amount of coverage stories get depending on their importance: 30%
3. Start fitting content into the paper by adding or removing information in the stories: 20%
4. Adjust and rework as more content comes in or stories evolve: 30%
5. Create final outputs of the pages: 5%

If automation takes over steps 2 through 4, you could save 50–80% of your team's time.

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Overall, the Smart Layouts system might test out as many as two million layouts per paper.

The Blueprint Engine Curates the Layout

To stay true to a paper's look and feel even with all these layout options, Smart Layouts employs “hard” and “soft” stylistic rules. A “hard” rule is followed 100% of the time, and a “soft” rule is always followed unless the system can't make it work—in which case it will break the rule for the sake of the story. This is exactly what human editors do, following all the stylistic conventions that are unique to the brand unless something comes up that requires the editor to make small compromises.

Overall, the system might test out as many as two million layouts per paper, using the Adobe InDesign server to measure all of the pieces of each story and then employing AI to determine which layout scores the highest based on how well it adheres to the hard and soft rules. The software then creates a blueprint for the winning layout.

In the future, the Smart Layouts ad stacking system will provide metadata about ad content that the algorithm will use to place the ads next to the most relevant stories. There will also be hard and soft rules pertaining to ads, so the software knows not to place certain ads next to certain types of stories. This will help the paper avoid potentially embarrassing or insensitive combinations.

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The Automated Workflow —from Draft to Printed Paper

Smart Layouts' Pagebuilder Creates Camera-Ready Pages and Tweakable Files

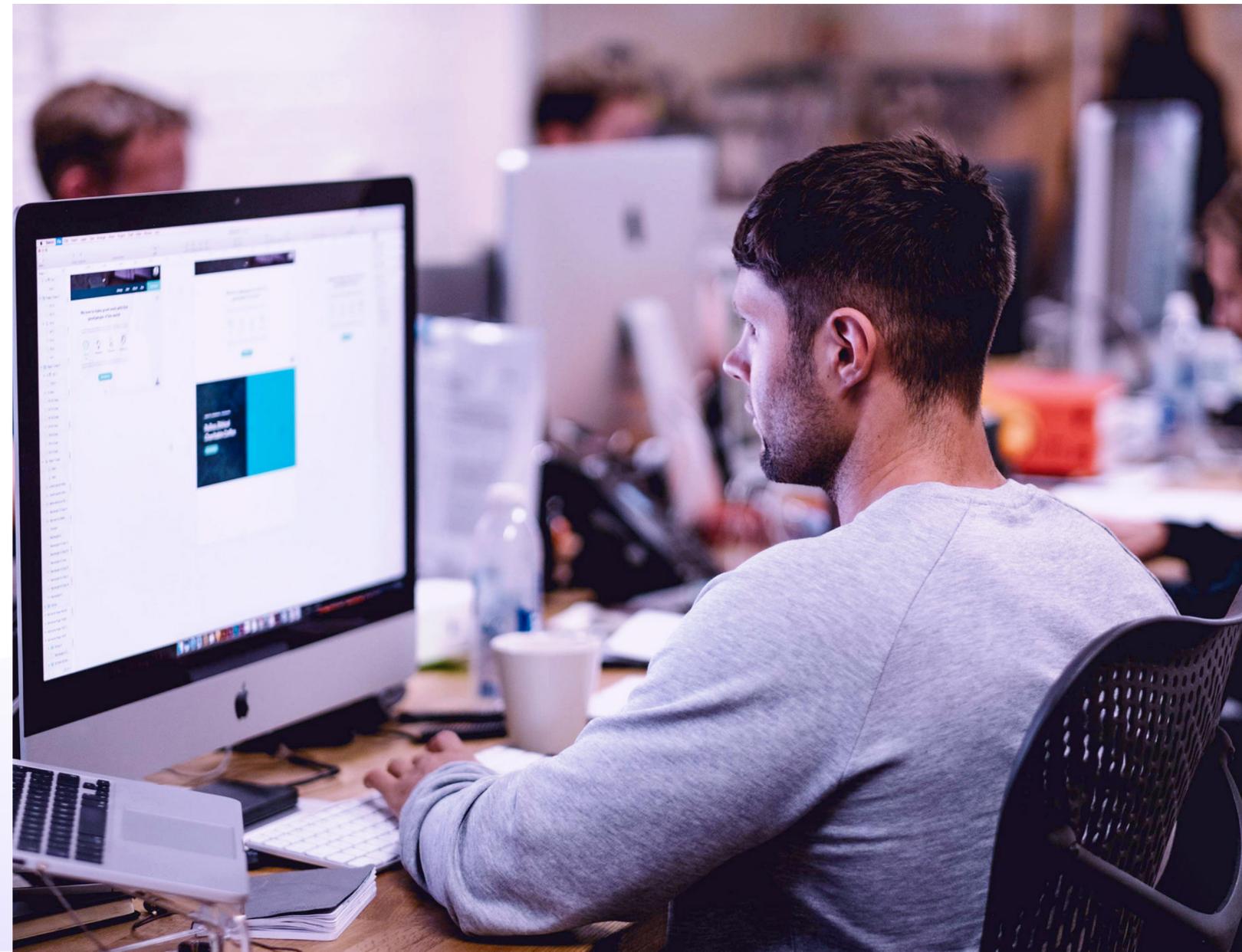
Finally, the Adobe InDesign server builds camera-ready pages based on the instructions from the blueprint. It also provides the InDesign files so the layout designer can make small tweaks if desired, such as altering a photo crop or correcting a misspelled headline.

When an editor manually adjusts a layout, the Machine Learning model uses this information to inform future layout options. An achievable goal for a newsroom might be that 90% of the paper is perfect as-is, and the editor needs to touch only 10%.

The software may need to omit an entire story to get the print edition to fall together perfectly. It outputs a report that alerts the editors to any omitted content, and also creates a “scratchpad” in the InDesign files to hold those stories.

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5.

Reallocating Resources from Print to Content



At least 22% of publishers surveyed are considering using print automation technology.

The average ROI for the average newsroom using automation is \$400,000 annually.

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Reallocating Resources from Print to Content

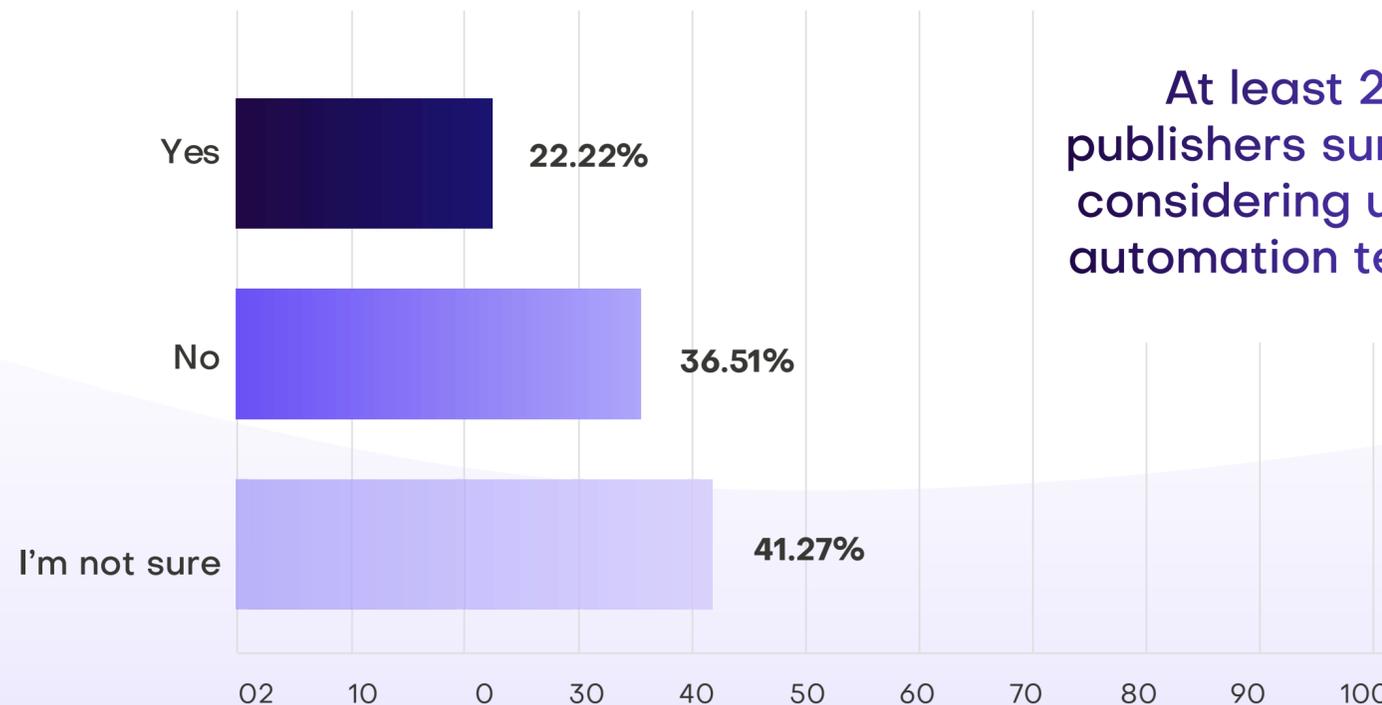
Many readers look to websites and apps for their news, but print is still an important part of newspapers' brands. Now, thanks to automated solutions that incorporate Artificial Intelligence and Machine Learning:

- ▶ **Journalists can focus on writing excellent content**, without worrying about constraining the word count to fit a print layout.
- ▶ **Channel-neutral content can flow as easily into the print paper (or e-reader) as it can onto a website or into an app.**
- ▶ **Subscribers get the benefit of reading full, rich stories**, and editors get the benefit of not having to cut stories for length.
- ▶ **Newsrooms can save hours (or days) of manpower** and use the newly opened time in a more strategic way. See the

sidebar "How Much Time Does Automation Save?" to calculate how much your newsroom can benefit.

- ▶ **Newsrooms can use the money they save with automation to create even more content.** With the average newsroom paying five print subeditors \$80,000 annually, the average ROI is \$400k.

Newspapers are starting to jump on board with automation to realize all these benefits; at least 22% of publishers surveyed are considering using print automation technology. To find out how your newsroom can implement Smart Layouts, watch this explanation video or contact Naviga for a demo.



At least 22% of publishers surveyed are considering using print automation technology.

THANK YOU.



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