

## WHITE PAPER

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### The Evolution of Wireless Photography

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Sponsored by: Nikon Inc.

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### IDC OPINION

Wireless connectivity can be an effective means for sharing photos, which fits well with the fact that most digital camera users already electronically share images. Forty-three percent of U.S. digital camera owners responding to an IDC Internet survey recognized that wireless connectivity is an important feature in choosing a digital camera. Camera manufacturers such as Nikon can use the feature as a critical differentiator in a consumer's future digital camera purchase decision.

To date, Nikon is the only digital camera manufacturer to consistently and fully embrace wireless photography. Nikon is also the only digital camera manufacturer to partner with third-party Web 2.0 photo sharing sites, giving consumers the choice of where to upload. Nikon's decision to open its technology is an important step for wireless photography to be fully embraced by consumers and should position the firm well in future consumer mindsets as a vendor that helps, rather than hinders, product usage.

### METHODOLOGY

This White Paper includes the results of an IDC Web-based survey of 500 U.S. digital camera owners, gauging their current adoption of wireless digital cameras and their propensity to embrace the capability in future camera purchases. The respondents were U.S. owners of digital cameras between the ages of 20 and 55 who use the cameras regularly.

The White Paper also draws from IDC's ongoing research on wireless connectivity, mobile devices, and digital cameras. Market data is acquired and refined based on a number of IDC proprietary and public sources, both primary and secondary. The information is then filtered through IDC's forecasting analysis process. This is an ongoing, iterative process in which initial forecasts are made, analyzed, and revised through the cooperation of IDC analysts worldwide. Forecasts, both worldwide and regional, are evaluated and revised to reflect the latest market information, including quarterly vendor performance and developing regional trends.

Note: All numbers in this document may not be exact due to rounding.

## IN THIS WHITE PAPER

This IDC White Paper provides analysis of the digital camera market and how the ability to send images from cameras through embedded wireless connectivity has the potential to buoy a category dragged down by declining prices and product commoditization. An overview of IDC's digital camera forecast and the history of wireless connectivity within digital cameras is offered.

This White Paper also includes the results of an end-user survey of U.S. digital camera owners, gauging their current adoption of wireless digital cameras and their propensity to embrace the capability in future camera purchases. Nikon's role as a consistent, leading provider of wireless photography connectivity-oriented products and services is also discussed.

## SITUATION OVERVIEW

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### **Global Digital Still Camera Market Trends**

The digital camera has been one of the most quickly adopted and successful consumer electronics categories in history. In less than a decade, the digital camera has effectively revolutionized how consumers capture, share, and print images, and it has fundamentally altered the way people embrace photography. The digital camera has been responsible for the rise of vendors that didn't even exist 30 years ago (e.g., memory card manufacturers) and threatened the survival of 100-year-old, venerable photography giants (e.g., film and paper manufacturers).

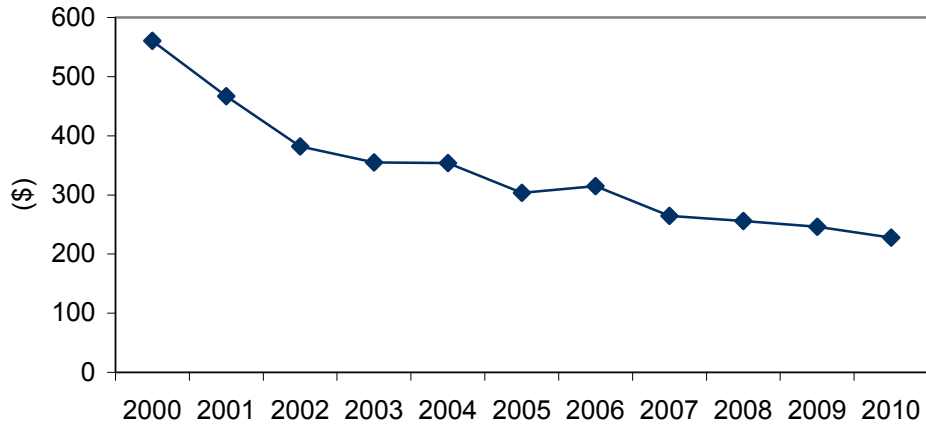
The digital camera market is now entering a mature phase in the United States, Japan, and Western Europe as affluent customers, well into their second or third generation of camera, seek more advanced features for less and less money. This has benefited vendors such as Nikon that are well positioned to offer more advanced cameras such as digital single-lens reflex cameras (DSLRs) to a new crop of advanced amateurs interested in pursuing digital photography as a hobby. As these developed regions move toward more moderated growth, huge growth opportunities still exist for vendors in developing regions such as Russia, China, and Latin America.

This market maturity has come with a price, as vendors seek to solidify their market share through price cuts, promotions, and harvesting manufacturing efficiencies. As a result, the global average system price (ASP) for a compact camera will decline from \$550 in 2000 to less than \$230 by the end of the decade (see Figure 1).

Consumers have been the largest beneficiaries of this market maturity, as they flock to purchase their third or fourth digital camera. IDC's supply-side consumer surveys indicate that the mean number of cameras per owner is 1.4, which remains unchanged from over a year ago, indicating that the digital camera market has begun to emulate the mobile phone market in terms of product churn. As a result, IDC is forecasting that the digital camera market will reach over 120 million units shipping globally in 2007 and will grow to nearly 140 million units shipping globally in 2011 (see Figure 2).

**FIGURE 1**

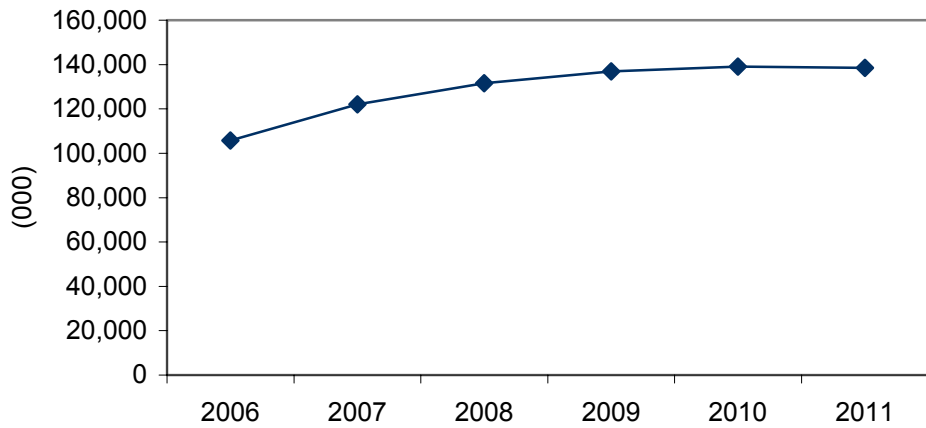
Worldwide Digital Still Compact Camera Average System Price Forecast, 2000-2010



Source: IDC, 2007

**FIGURE 2**

Worldwide Digital Still Camera Unit Shipment Forecast, 2006-2011



Source: IDC, 2007

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## Combating Commoditization

Camera manufacturers have sought to combat commoditization through a variety of means. Historically, vendors simply added more megapixels of resolution to their products every 6 to 12 months, which provided an easy way to segment products and associate price points.

While this made sense in an emerging market, the customer base has become much more savvy, resulting in a continual search for other marketing-centric features, including:

- ☒ **Vibration reduction (VR)**, also known as optical image stabilization, is a feature found on high-end 35mm lenses and camcorders. By using mechanical gyroscopes and intelligent lenses, VR reduces the chance of capturing a blurry image. Beginning in 2006, vendors began to offer this feature on a critical mass of compact cameras.
- ☒ **Facial focus tracking** is an intelligent autofocus feature that allows the camera to properly focus on the faces of subjects within a given picture. Nikon began to incorporate this feature in its lineup in 2005, and it began to be adopted en masse by most other camera manufacturers in 2007.
- ☒ **Optical zoom** with increasingly longer ratios (i.e., 10, 12, 15 times) has been used to market higher-end compact cameras since 2002.
- ☒ **LCD screen sizes** have increased from 1.5in. prior to 2004 to 2.5in. or 3in., while pink, purple, brown, and green **colored camera bodies** have lured the fashion conscious to buy new cameras since 2004. The ability to rudimentarily **edit images** was marketed starting in that time period as well.
- ☒ **Image optimization** allows for the creation of more pleasing pictures. From **red-eye** fixes and removal to Nikon's **D-Lighting** exposure correction, these technologies help consumers get the most out of their cameras.
- ☒ **Video capture** has increased in adoption and quality over the past three years as vendors add stereo sound and rudimentary high-definition video capture and better compression codecs to cameras.
- ☒ **Wireless connectivity** made its debut in the digital camera market in 2000, yet the ability to transfer images wirelessly without using USB cables has had a rocky history, and it is only now that the capability has truly begun to catch on in terms of usability and consumer consciousness, in large part due to Nikon's consistent development efforts.

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## "Take a Picture That Can Fly"

Photography has always been about sharing memories, and the advent of digital photography has meant that consumers have been able to share locally at the point of capture or around the world through email or posting to Web sites. This is not without problems, as the roadblock to sharing has always been the ease (or lack of ease) in getting the digital pictures out of the camera. While this is done widely through USB or memory card-to-PC transfer, the ability to wirelessly share images, or at least wirelessly transfer them to a PC, has been the holy grail of digital photography.

### ***Wireless Photography Connectivity Strategies***

Camera vendors have sought to implement wireless connectivity in-camera through two specific strategies: either as a local, USB cable replacement (i.e., local area strategy) or as a direct connection to the Internet (i.e., wide area strategy). Four technologies have been implemented to date:

1. **Bluetooth** is a wireless connection suited to smaller data packets and local area connectivity. While Bluetooth is appropriate for voice and basic data connectivity between locally positioned devices (i.e., a cord replacement), large image file sizes make the option too slow and power-hungry for the 50-plus average number of images consumers capture monthly.
2. **IrDA/infrared** wireless connectivity relies on an infrared signal to transmit data and is found mostly on mobile phones and PCs. Infrared connectivity not only is a short-range, low-bandwidth solution but also must rely on a clear line of sight with the receiving device or risk disrupting data transfer.
3. **802.11** has been the de facto standard of choice for the implementation of wireless networks and the devices residing on those networks. The technology has been widely adopted in notebook PCs, routers, and an increasing number of mobile phones. This open standard is also becoming increasingly familiar to consumers and has a similar usage model regardless of vendor or network implementation. 802.11 is quickly becoming the backbone for wireless Internet connectivity inside home networks and is also behind the VoIP telephony revolution. With regard to photography, 802.11 allows for both local connectivity between camera and PC for image transmission or between a camera and the Internet for instant sharing and storage.
4. **Future wireless protocols** lie on the horizon, but they have yet to be implemented as widely as the previously mentioned protocols. DLNA is a wireless specification that is just beginning to be adopted by consumer devices within home networks. While the technology allows for local area connections within a wireless network, thus hooking onto the Internet, it also allows for peer-to-peer connections with similar devices. Ultrawideband (UWB), WiMAX, and Wireless USB all promise to enlarge the local area, provide more seamless connectivity, or make the experience much more user-friendly. Still, 802.11 continues to be popular as a widely adopted open standard for devices and networks.

### ***Early Efforts at Wireless Photography***

Early efforts in the form of marketed products and services began in 2000 with three specific developments: the introduction of Ricoh's RDC-i700 digital camera, HP's embrace of infrared connectivity, and the rise of embedded cameras in mobile phones in the Japanese market.

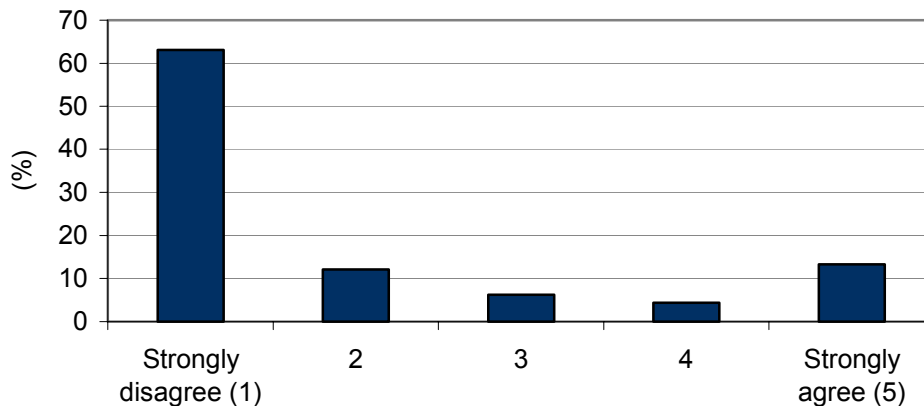
1. The Ricoh RDC-i700, a \$1,000 3MP camera, had the capability to add a modem or wireless card, as well as firmware that allowed users to email images directly from the camera. Still, the wireless feature was not included, and the high price tag, coupled with a lack of marketing and consumer Internet infrastructure for sharing wireless data, meant the RDC-i700 was ahead of its time.

2. In 2000, HP implemented JetSend, an infrared-based connectivity option that allowed users to connect the camera to a PC with infrared port. While this feature was rolled out on a variety of HP digital cameras, the limitations of using infrared to transmit images became clear, and the firm discontinued it in 2003.
  
3. More importantly, the advent of what came to be known as the "camera phone" arose through J-phone in the Japanese market in the autumn of 2000. As the capability to take pictures with mobile phones slowly spread throughout the world, early prognostications were that the sharing functionality supported by wireless broadband would cannibalize the digital camera market. The opposite happened; camera phones continue to lag behind digital cameras in terms of pricing, features, and style, and consumers have continued to view the two devices as having separate, yet valued uses. Figure 3 highlights consumers' attitudes toward both devices.

**FIGURE 3**

Camera Phone as Digital Camera Replacement

Q. *How much do you agree with the statement, "Now that I own a camera phone, I have no need to own a digital camera?"*



Base = primary users of camera phones only (not primary users of digital cameras)

Source: IDC's *U.S. Consumer Digital Imaging Survey*, 2007

### ***Restarting the Wireless Revolution?***

As 2005 dawned, so did the next phase in wireless photography. Several top camera manufacturers introduced cameras and services featuring wireless connectivity with the Internet, the PC, the printer, or a combination of all three.

- ☒ Eastman Kodak first announced its EasyShare One digital camera, a 4MP camera with a touchscreen/stylus interface and the capability to upload images to the Kodak EasyShare Gallery, email links to friends and families, or transmit images to an 802.11-capable photo printer, all using an optional wireless card. While a second iteration of the camera, adding Bluetooth short-range capability, was introduced in 2006, the proprietary nature of the Kodak product/service strategy, which focused on funneling customers into the EasyShare experience, hindered adoption of the device.
- ☒ In the fall of 2005, Nikon introduced the COOLPIX P1 and P2 wireless digital cameras, which utilized 802.11 for local area connectivity only. These cameras would allow transmittal to a PC utilizing Nikon's software, or through a router, and the user had to first set up a profile in the PC before even using the wireless feature and deal with any network security features along the way.
- ☒ Canon introduced the PowerShot SD430 Digital ELPH Wireless, a 5MP camera, in February 2006. The camera was the vendor's first wireless effort, featuring 802.11 connectivity, and was kitted with a USB 802.11 dongle for connection to a printer. While the SD430 featured 802.11, it was implemented as a local area connection usage model only, and, priced at \$499, the camera was not heavily marketed. To date, Canon has not followed up with another wireless model.
- ☒ At the same time, Nikon followed up with the COOLPIX P3 and S6 wireless digital cameras, which added vibration reduction technology. These two cameras reiterated Nikon's commitment to provide wireless photography solutions.
- ☒ Furthermore, Nikon took the next step in August 2006 with the introduction of the COOLPIX S7c, which added wide area connectivity through a partnership with T-Mobile, allowing users to upload 50MB of images to a T-Mobile account for sharing with friends and family via email links. The firm also introduced the COOLPIX CONNECT service in the autumn of 2006. COOLPIX CONNECT allowed consumers to utilize Nikon-specific servers for sharing images with friends and family, adding the ability to share Web-friendly images.
- ☒ The beginning of 2007 brought renewed, industrywide efforts in implementing wireless connectivity in digital cameras. Sony entered the fray with its DLNA-based Cyber-shot G1 camera, designed for peer-to-peer connectivity and operation inside home networking environments.
- ☒ Nikon also introduced the second generation of its CONNECT service — COOLPIX CONNECT 2 — with the introduction of the COOLPIX S50c wireless digital camera. This camera added the ability to detect wireless networks and upload images to a variety of third-party sites such as Flickr.

## **FUTURE OUTLOOK**

As wireless photography moves into the future, Nikon continues to be a leader in introducing new features.

Nikon has added the S51c wireless digital camera to its product line and rebranded its COOLPIX CONNECT 2 Internet photo archiving and sharing service as my Picturetown in August 2007. To gain more consumer acceptance, Nikon has added a Picture Mail button to the S51c, allowing users to email images in 4 steps rather than the 13 steps required by previous cameras.

Nikon's my Picturetown marks a new service strategy, which continues to include 2GB of free storage and adds the ability to link to third-party forums and view images on Blackberry devices and blogs, making it a true photo sharing and storage hub.

To date, Nikon is the only digital camera manufacturer to consistently and fully embrace wireless photography. IDC predicts that other top vendors will seek to catch up and embrace wireless photography as well, spurring industrywide adoption.

## **CHALLENGES/OPPORTUNITIES**

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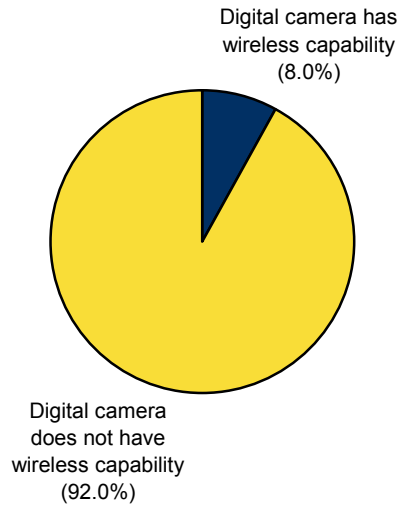
### **The Consumer Perspective**

How does wireless connectivity resonate with U.S. digital camera users? Clearly, according to Figure 4, only 8% of respondents cited owning a wireless digital camera, which fits with the current market issues surrounding the technology. Still, wireless connectivity may play an important role in a consumer's next digital camera purchase. Over 60% of respondents cited that they would be somewhat or much more likely to consider one camera over another should it include wireless connectivity (see Figure 5). Most importantly, however, is that consumers indicated that they are willing to pay an average of \$78 more for wireless connectivity in their next camera purchase, and Nikon owners are willing to pay \$86 more (see Figure 6). Clearly, a set of consumers value the feature and are willing to pay a premium for it.

**FIGURE 4**

Percentage of Digital Camera Owners Who Cited Owning a Wireless Digital Camera

Q. *Does your digital camera have the ability to send pictures wirelessly to or receive pictures wirelessly from a PC or through a wireless network, without taking out the memory card or hooking up the camera with a cable?*

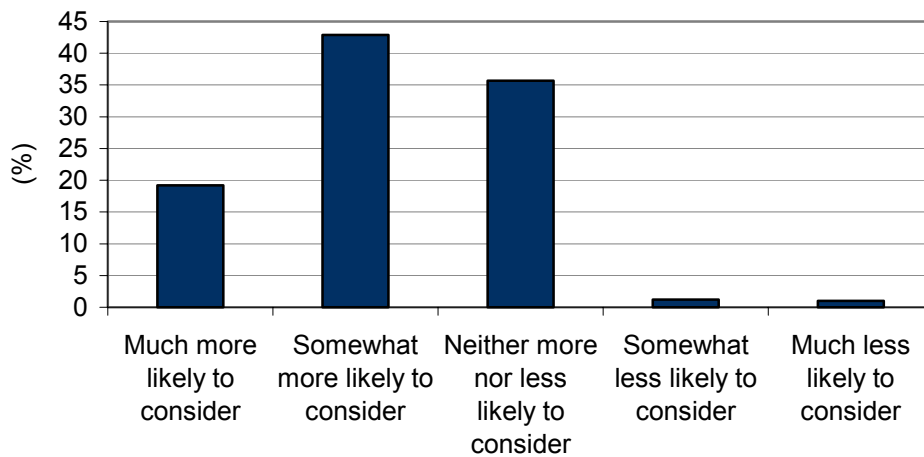


Source: IDC, 2007

**FIGURE 5**

Influence of Wireless Capability in Selecting Next Digital Camera

Q. *If a digital camera included WiFi capability, that is, the ability to upload photos directly from a camera to a PC ... would you be more likely or less likely to consider that camera because of the WiFi capability?*

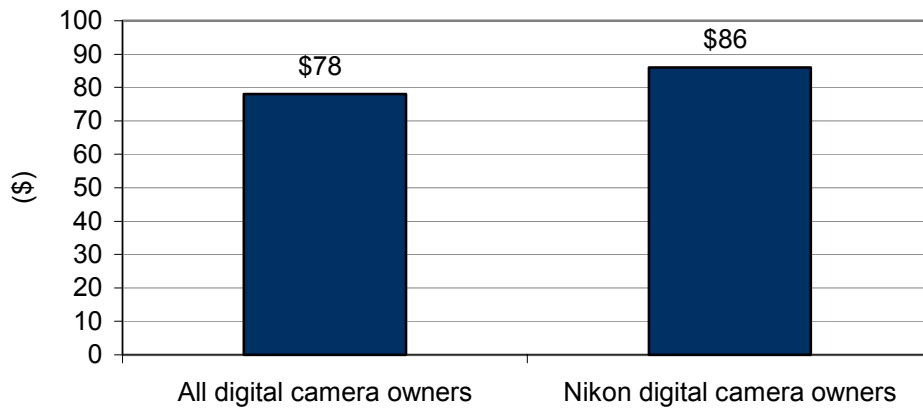


Source: IDC, 2007

**FIGURE 6**

**Willingness to Pay More for Wireless Connectivity in Future Digital Camera Purchases**

Q. *How much more would you be willing to pay for a digital camera with WiFi capability compared with a similar camera without WiFi?*



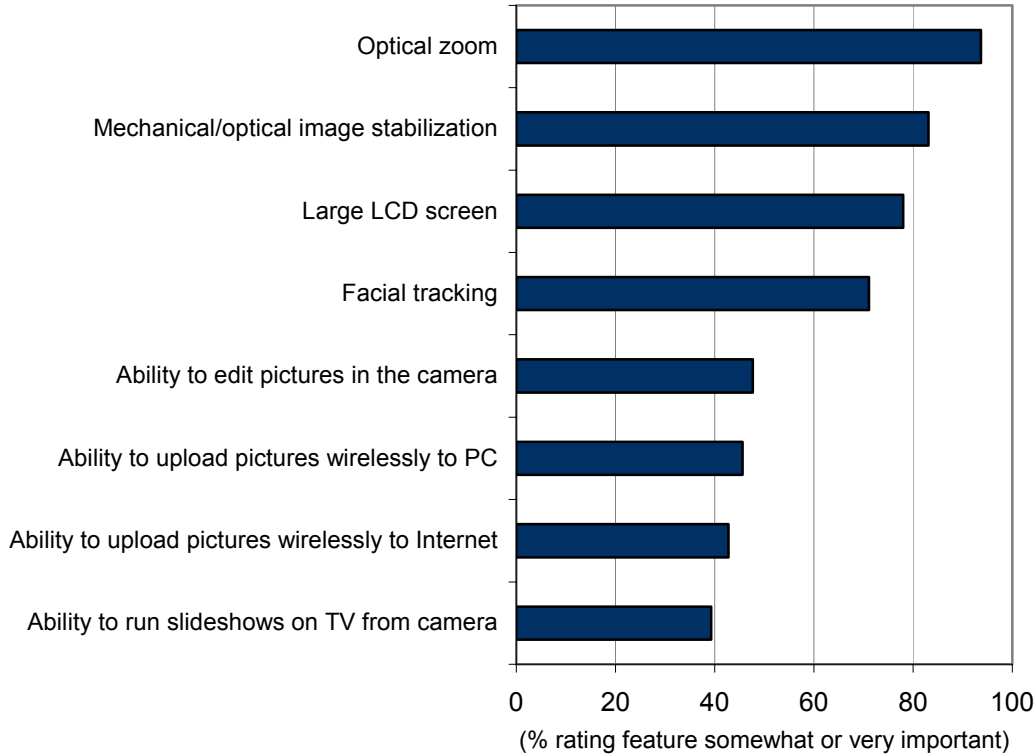
Source: IDC, 2007

**Challenges Lie Ahead**

While wireless digital cameras have existed since 2000, and the capability to seamlessly share images from mobile devices is prevalent around the world, the feature has been met with less-than-expected enthusiasm. When digital camera owners were asked to rank the importance of specific features in their next digital camera purchase, they ranked wireless connectivity sixth and seventh out of eight features tested (see Figure 7).

**FIGURE 7**

**Important/Very Important Features in Future Digital Camera Purchases**



Source: IDC, 2007

Furthermore, while the adoption rate of wireless home networks is set to grow to over 50% of U.S. households by 2011, this adoption rate is much slower than those in other, developed countries. Also, in surveys of wireless home network users, sharing photos tends to be ranked far below other activities such as Internet surfing, online shopping, and making travel reservations.

Because the United States is a huge consumer of digital cameras, what happens with the wireless connectivity infrastructure has an impact on the adoption of wireless digital cameras. Still, the critical factor will be growing user awareness of how wireless connectivity can simplify the sharing of photographs, whether it be for sharing with friends or for reducing workflow and costs for businesses, such as real estate.

Digital camera vendors will be solely responsible for increasing awareness among wireless network users about the benefits of using wireless digital cameras via strong marketing efforts.

## CONCLUSION

IDC believes that while most consumers value and have experience with standard feature sets that include optical zoom and large LCDs, interactive features such as wireless connectivity have yet to really penetrate the mass digital camera consumer's consciousness. IDC believes that consumers will be drawn to wireless connectivity features through vendors' implementing systemic, not product-based, solutions and by more effective marketing of this feature. For instance, Nikon is providing cameras with built-in wireless connectivity, access through open hotspots, and Internet services such as my Picturetown, which gives users reasons to utilize wireless connectivity.

Wireless connectivity can be an effective means for sharing photos, and it fits well with the fact that most digital camera users electronically share images already. IDC notes that when people recognize both the "wow" factor wireless creates, and the utility the feature provides, they will be more likely to choose cameras with that capability.

Almost all of the past and current efforts by digital camera manufacturers have centered on creating wireless cameras with the notion of usability as a mere afterthought. Nikon is the only camera vendor to consistently support wireless photography from a systemic, strategic view. The firm not only has focused on improving wireless connectivity but also has been willing to take further steps (e.g., partnering with T-Mobile and fleshing out the back-end service offering in the form of my Picturetown).

Most tellingly, Nikon is the only vendor to partner with third-party Web 2.0 photo sharing sites such as Flickr, giving consumers the choice of where to upload photos. IDC believes Nikon's decision to open its technology is critical for wireless photography to be fully embraced by consumers and positions the firm well in future consumer mindsets as the vendor that helps, rather than hinders, product usage.

The battle is far from over, however, and IDC predicts that other camera manufacturers will see this success and more fully enter the space; therefore, market messaging will remain key for Nikon, as success or failure rests with this message and the widespread usage of wireless photography as well.

## DEFINITIONS

- ☒ **Shipments.** Shipments refer to newly built devices that are sold to a customer — end user, OEM, or any intermediary — in a given year. Equipment shipped in a previous quarter that is brought in from the field to be refurbished and remarketed is not considered newly built and is not counted in the shipment totals.
- ☒ **Revenue.** Revenue refers to aggregate revenue generated for camera dealers based on camera vendor unit shipments. Revenue is based on camera introductory MSRP (manufacturer suggested retail price). This does not account for price drops, rebates, or other promotions, including hard and soft bundles with other products like photo printers and memory cards.
- ☒ **Average system price (ASP).** ASPs are the average unit pricing per megapixel segment per year.

- ☒ **Megapixel (MP).** Megapixel refers to the number of light-sensing diodes, in millions of units, on the image sensor inside a digital still camera. For example, a 7MP camera has an image sensor with 7 million active light-sensing elements. Traditionally, the consumer categories have been marketed and segmented by megapixel into low-end, midrange, and high-end segments.
- ☒ **Compact digital camera.** Formerly known as consumer point-and-shoot digital still cameras, these are traditional consumer-oriented digital cameras. They offer a variety of feature sets and resolution levels as well as varying degrees of product and image capture quality. All of the models have removable memory and a color LCD display that can display the images captured, and the vast majority have the ability to capture video as well. They may also have wireless image transmission capability. The compact digital camera category is examined by resolution: 3MP or less, 4MP, 5MP, 6MP, 7MP, and 8MP+. These cameras are currently list-priced between \$99 and \$699. Examples of this category are Nikon COOLPIX S50c, Sony DSC-W85, and Canon PowerShot SD1000.
- ☒ **Digital single lens reflex (DSLR) category.** These cameras are digital versions of 35mm SLR film cameras. They feature interchangeable lenses, standard high-end camera bodies, and professional controls. Resolution in this segment currently ranges from 6MP to 13MP. Prices for digital SLRs currently begin at \$499. Examples of this category are the Nikon D80, Canon EOS-1Ds Mark 3, and Nikon D200.

## RELATED RESEARCH

- ☒ *Worldwide Digital Camera 2007–2011 Forecast Update* (IDC #208141, August 2007)
- ☒ *2007 U.S. Mobile Imaging Survey* (IDC #207847, August 2007)
- ☒ *2007 U.S. Consumer Digital Imaging Survey* (IDC #207516, July 2007)
- ☒ *Worldwide Camera Phone and Videophone 2006–2010 Forecast* (IDC #204456, December 2006)
- ☒ *U.S. Home Networking 2007–2011 Forecast* (IDC #206009, March 2007)
- ☒ *2007 Survey of U.S. Home Networking Use and Attitudes* (IDC #207363, July 2007)

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