VI. Review of Related Literature

**Weather Stations**

Weather stations are devices used by several weather-related companies that, as the name implies, collect data that are related to the weather and environment. These weather stations use multiple sensors to be able to forecast and analyze weather. The sensors that are usually included in a weather station are barometers that measure the atmospheric pressure, thermometers to measure the temperature, hygrometers that measure the percentage of water vapor in the air or humidity, wind vanes that could tell the direction of where the wind is blowing, anemometers that measures current, peak, and average wind speeds, rain gauges that measures rainfall, and several other sensors depending on the manufacturer. Weather stations aren’t just for professional use, there are also weather stations being sold for home use. (Acurite, 2010)

Weather stations also come in two main types, manual and automatic stations. Manual weather stations are the traditional weather stations which are analog when measuring certain weather data. On the other hand, automatic weather stations, or AWS, have two main parts which are outdoor and indoor. The outdoor components of an AWS are the sensors that collect weather data, which then is sent to the indoor component of an AWS that displays the measurements and readings of the AWS. Many people, up to this day, still use the traditional manual weather stations, while many companies have migrated to the usage of an automatic weather station. One difference between a manual weather station and an automatic weather station is cost, with the latter being more expensive. (Moore, 2016)

**Barcode and RFID**

Barcoding, or barcode system, is a form of collecting data and an identification tool which does not require the use of physical keys. Barcodes are the black bars with gaps which are parallel that hold data contained in binary coding. Barcodes nowadays also come in other shapes such as rectangular ones. Each individual barcode has a unique pattern or shape that can correspond to an item or object. These barcodes are read using optical lasers which can interpret numerical and alphanumerical characters. According to Zebra Technologies, several forms of manual data collection and data entry has been replaced by the barcoding system. This is because the speed, as well as the accuracy, at which data is retrieved by barcoding is extremely quick and accurate. Zebra Technologies state that these barcoding systems are accurate 99% of the time. This is important due to the fact that data entry errors could cause negative effects on a business such as a wrong input of data within a manufacturing company could cause a decrease in production due to wrong values. (Zebra Technologies, 2013) Barcode technology could greatly impact the back-end of a business for numerous reasons. One of which is an improvement of the accuracy of data. This alone could possibly be the main intention for implementing a barcode system. The reason for its accuracy is due to the fact that the information are kept within the individual barcodes itself in which almost no human error could occur. According to BarCode ID Systems, the implementation of barcoding could greatly decrease operating expenses and have a noticeable return of investment with 6 months. Research also shows that barcode could increase warehouse operations inventory accuracy to about 99%. (Barcoding Inc., n.d.)

RFID, or Radio Frequency-Identification technology, is another type of tool used for data collection and uniquely identifying an item, similarly to barcodes. RFIDs contains a tiny chip and an antenna. As the name implies, RFIDs use radio frequencies to communicate with an RFID tag, or a transponder that contains information, which is interpreted using a transceiver that could interpret data. On paper, RFID is more sophisticated than barcodes with features such as farther read distances, faster read and write speeds, larger data capacity, higher levels of security, and many more. RFID systems also have their downsides though. Its drawbacks include higher pricing since it contains a computerized chip, and reader and tag collision errors when multiple readers and tags could cause errors to one another. (adaptalift, 2012)

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